TECHNOLOGY DEPARTMENT

THE CHEMICAL AGE

VOL LVIII 13 MARCH 1948 No 1496

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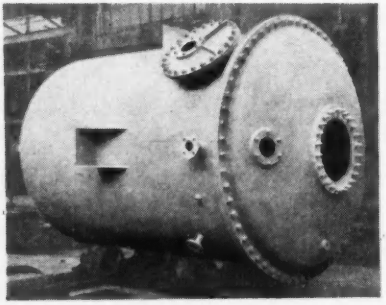

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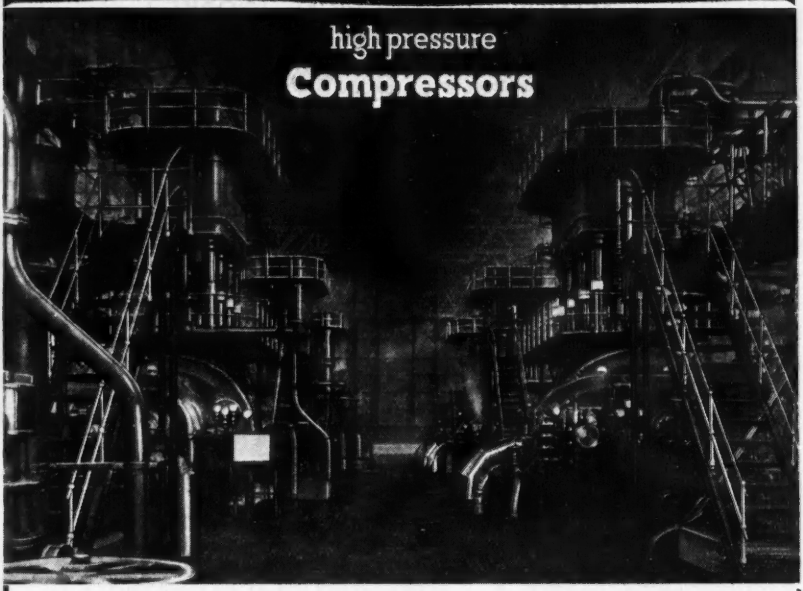

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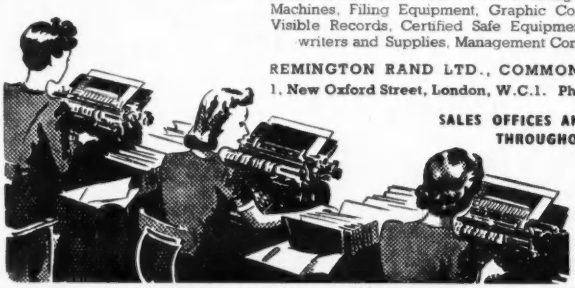

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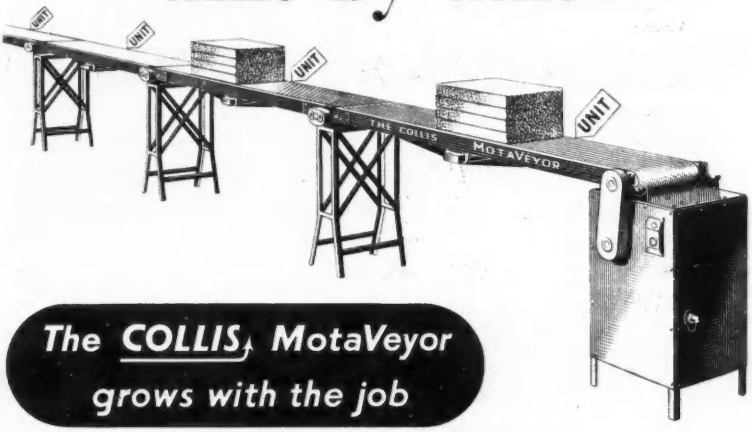

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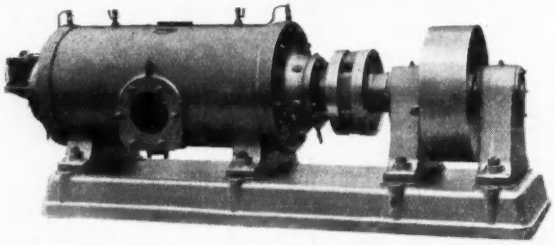

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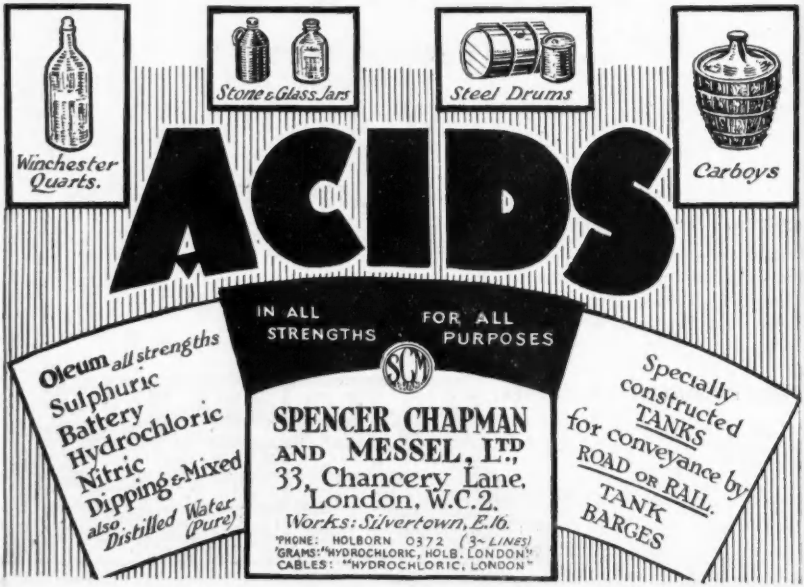

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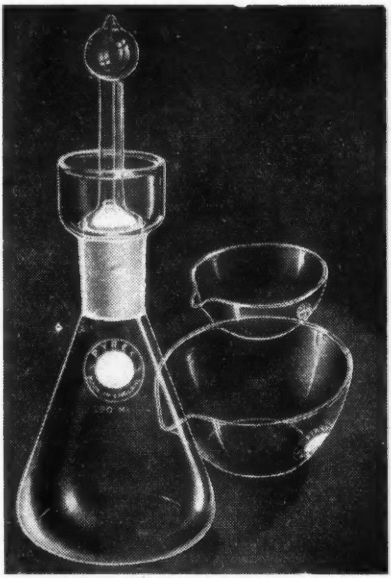

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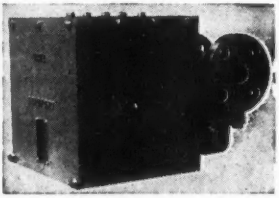

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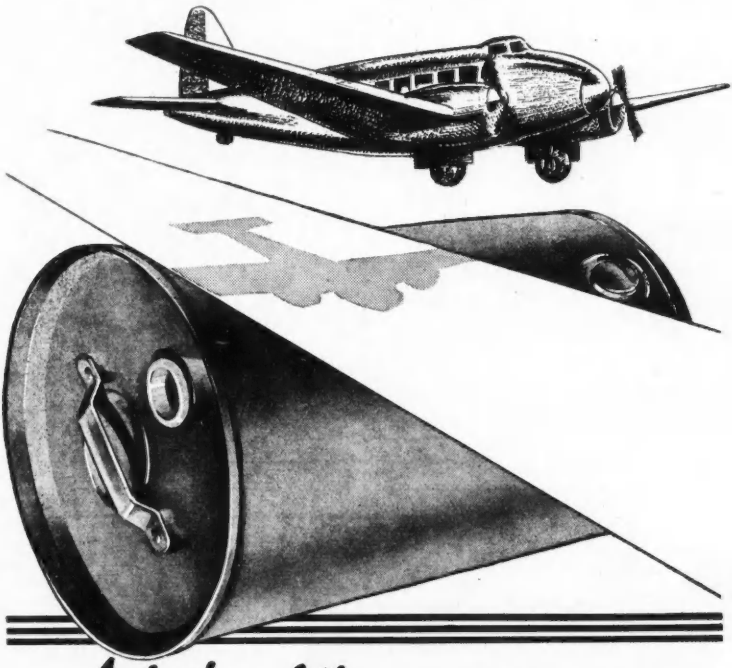

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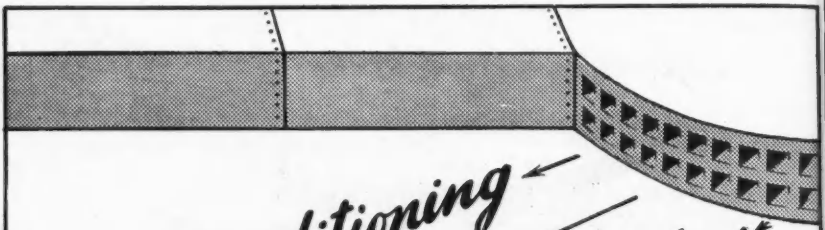

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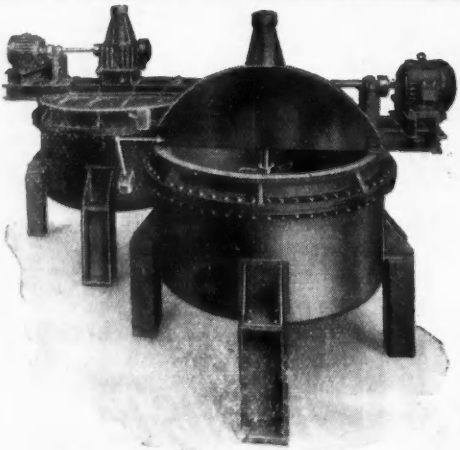

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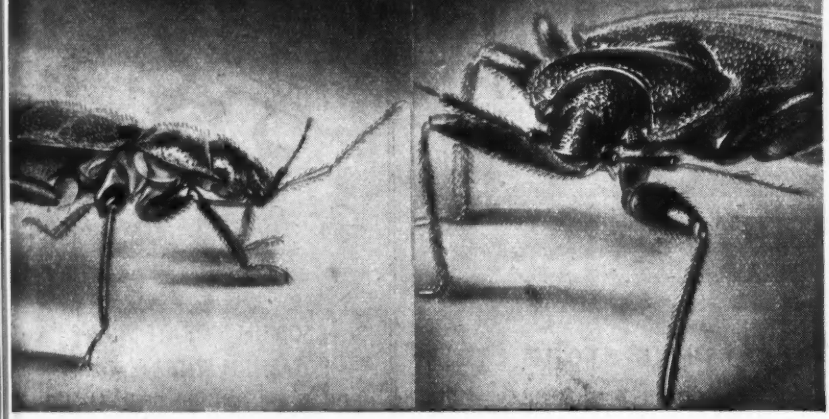

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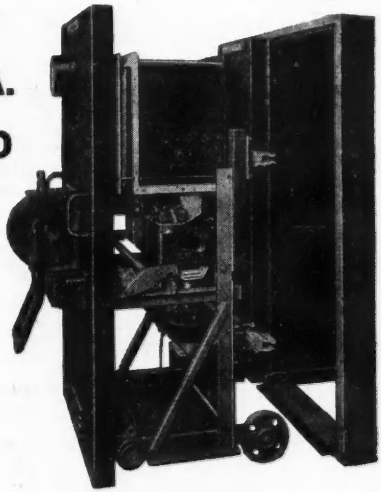

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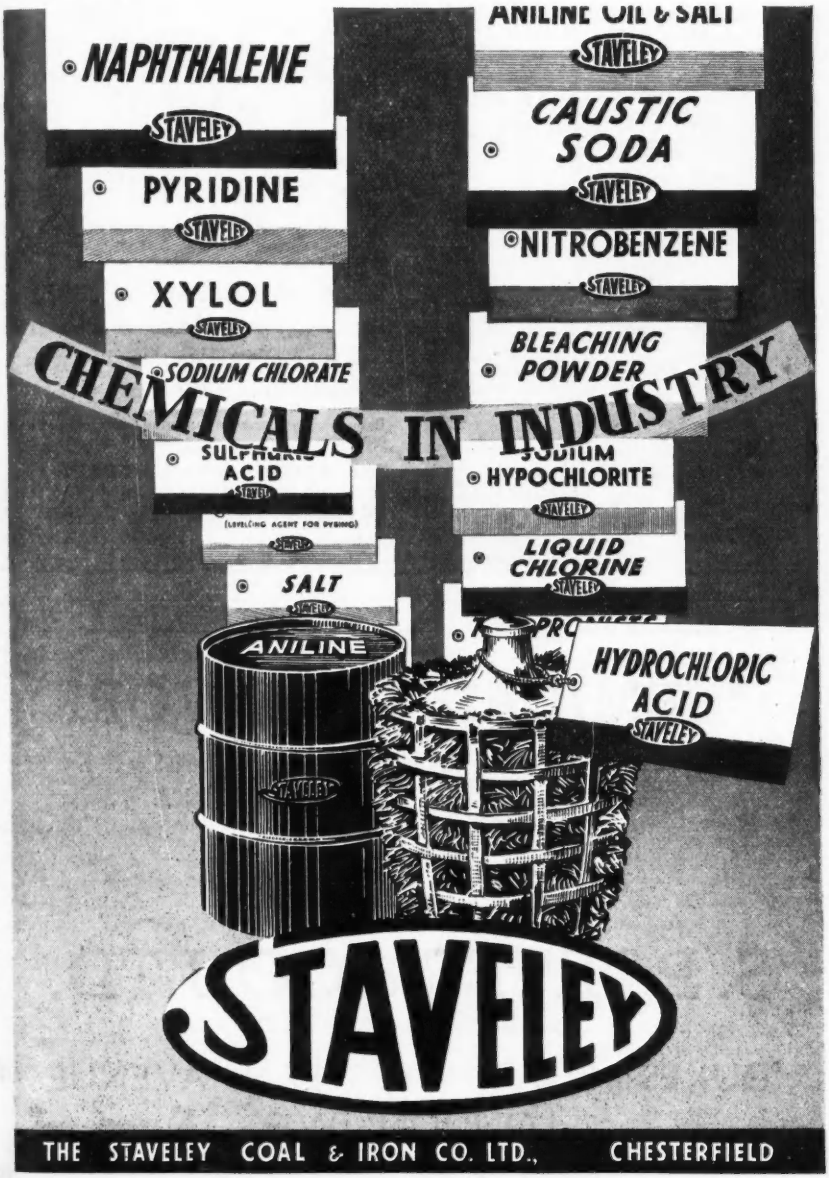
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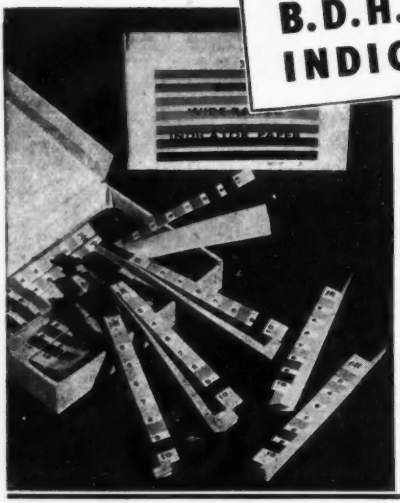

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The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers Limited

VOL. LVIII No. 1496. 13 March 1948 Annual Subscription, 26s. 8d. per copy; post free, 10d.

Benzol Plant Sludges

THE satisfactory control of a benzol plant is not particularly difficult provided good operating conditions are maintained in the process. The gas should be de-tarred, preferably in an electrostatic plant, cooled to atmospheric temperature and brought into good contact over the maximum surface with creosote oil, which should be of low viscosity and held at approximately the same temperature. Temperature and contact are the bases of good operation, in which respect the benzol recovery process is equivalent to most other processes involving absorption of a gas in a liquid.

One of the major difficulties has always been that the creosote oil used for absorbing benzol is prone to thicken. Why this happened no one knew. Thickening was reduced substantially when the mechanical tar extractors used in the earlier days of the carbonising industry were replaced by electrostatic precipitators, thereby cleaning the gas to a hitherto unknown degree of purity in tar extraction. This, however, did not entirely solve the problem. The Clayton oil regeneration plant largely solved this difficulty by distilling a portion of the washing oil, discarding the high-boiling fraction remaining in the still and cooling the distillate for removal of naphthalene. It has been installed on most coke-oven plants. The difficulty became intensified, however, when the high price of creosote oil and other causes persuaded nearly all gas-works and 30 out of 100 coking plants to adopt petroleum oils for benzol absorption in place of creosote. The result was deposition of solid material and sometimes of emulsions on the grids of the scrubbers and on the heating surfaces of the stills leading to increased consumption of oil, steam and cooling water, and a decrease in benzol production.

In these conditions a serious position developed on the outbreak of war from the reduction in benzol production. The Ministry of Fuel and Power appointed a Benzol Technical Committee and took a lively interest through its technical officers in the operation of benzol plants all over the country. In view of the difficulties caused by sludging, the technical committee was given the task of investigating the sludging of petroleum oils used for benzol recovery and this committee, which operated on this subject from 1942 to 1946, has now published its findings in a document of 110 pages issued by H.M. Stationery Office.

It cannot be said that the committee's investigations have completely solved the problem, which is one of peculiar complexity. Both creosote oil and petroleum oil are prone to form substances which cause sludge, although both are very different in chemical constitution; creosote dissolves sludge whereas petroleum precipitates it. The gas which is washed for benzol contains many constituents, some complex and unsaturated, such as indene, in small amounts but sufficient to cause difficulties in view of the very large quantities of gas dealt with. The experienced chemist would, of course, immediately

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suspect unsaturated compounds as being a probable starting point, but there are many other possibilities which cannot be left out of account.

The committee is to be congratulated upon a very workmanlike performance resulting in a report which certainly takes the subject a great deal farther than any previous investigation. If from one point of view the work was a failure, it was a glorious failure, and some practical precautions have been proposed and material assistance given in reducing the difficulties.

The investigations have shown that the carbonaceous materials responsible for thickening and sludging are unsaturated compounds derived both from the gas and the oil, but probably the high-boiling unsaturated compounds in the gas accumulating in the wash oil, are mainly responsible. The oil also plays a part in sludge formation, however, and it appears likely that oxidation and condensation of high-boiling and unsaturated compounds, such as indene, carried in the gas have promoted reactions involving certain constituents of the oil, a phenomenon which has been made familiar by the oxidation and gumming of motor fuels. Liability for this reaction in any particular oil can be determined by an oxidation-sludge test devised by the committee and it is suggested that this test should form part of any future specification of benzol wash oil.

These investigations have supported the views of earlier investigators that thickening and sludging of wash oils is basically an oxidation process; in the complete absence of oxygen it is probable that sludge formation would be entirely suppressed. The high oxygen content of the deposits obtained from the sludges and their solvent extracts confirmed the view that sludge is an oxidation and condensation product rather than one formed by polymerisation of unsaturated compounds. This conclusion is especially important because it has further been shown that variation in the oxygen content of the gas between the limits 0.1 and 2.0 per cent had no pronounced effect on sludging trouble. This is significant and not unexpected, since oxidation would probably not occur with any considerable velocity at the temperatures used in benzol absorption. Any oxidation that occurs would be much more likely to take place at higher temperatures, *i.e.*, in the still or heaters.

Live steam is used for benzol absorption and it is well known that steam contains oxygen. It would appear, therefore, that the basic problem is to remove oxygen from the steam used in the still. This may not be the whole problem, however, because oxygen can also come into contact with the oil in the de-benzolised oil storage tank.

Previous investigators usually reached the conclusion that hydrogen sulphide promotes sludge formation because of the greater prevalence and severity of sludging troubles at works scrubbing unpurified gas. This conclusion is broadly in agreement with the committee's investigations and it concludes that the oxidation of hydrogen sulphide to elemen-

(*Continued on page 354*)

NOTES AND COMMENTS

Evading the Issue

WHAT, one wonders, would now be the productive and financial condition of some of our large chemical manufacturing groups if since 1945 they had so consistently expanded unusually ample administrative staffs as to have on their present pay roll one manager, accountant or clerk for every nine men producing chemicals. The conception is, of course, ridiculous and the only excuse for the fantasy is that this, in actual and alarming fact, is what the present Administration has done with the national pay-roll. That fabulously unbalanced misuse of our limited manpower has obliged the National Union of Manufacturers this week—not for the first time—to address an urgent appeal to the Chancellor of the Exchequer "to stop at once every phase of Government activity and every one of its projects not necessary to the national recovery." There are, the NUM points out, at present some 3 million persons in this country's Civil Service, NFS, Police and Civil Defence, in fact "not gainfully employed"—to adapt the Government's own phrase—for every nine in civil employment. What the NUM has to say about this, the equally inflated level of direct taxation and the lamentable prohibition of capital expenditure is not new, but it required to be said again because of the fresh evidence represented by the current Economic Survey, that the Government has still no intention of dealing realistically with this conglomerate Old Man of the Sea whose embrace could in the long run be fatal. As if in re-affirmation of a firm policy of placing party policies before all else the Government is reported even now to be cogitating an inquiry into "monopolies and restrictive practices." This will refer to private industry, not, as might reasonably be thought, to Government and trades union policy.

Unregarded Markets

SO familiar have we now become with the fluctuating fortunes of the "sellers' market" that it seldom occurs to anyone to ask just which market this is. Generally, one supposes, the Western European and hard currency commercial centres are the points at which the proverbial "pulse" is read, regardless of the fact that there are besides vast areas of the globe supporting teeming populations whose need, especially for certain heavy chemicals, is infinitely more acute. It can hardly be doubted that could we produce the tonnage on a sufficiently ample scale and they an acceptable currency or sufficient of the natural products of which the world is in need, the present precarious balance of our mercantile affairs might cease to worry anyone. China, the subject of an unusually painstaking investigation by the United Trade Mission, whose report is summarised elsewhere in this issue, is a typical example of the great under-supplied areas of the globe which through economic upheaval—in this instance the result of interminable civil war—has been "written off" most nations' trading programmes. Because the pound sterling, worth 8000 Chinese dollars when the report was written, was the equivalent of 440,000 dollars about a month ago and may command twice that number a week or a month hence, the firm basis of trading is lacking. Hence China's desperate need, especially of such things as fertilisers and dyestuffs, must go unsatisfied; and the multiplicity of natural materials with which in a peacetime economy China could recompense her suppliers has been reduced to pitiful proportions. These seem good and sufficient reasons for having virtually struck China off the list, until one recalls how assiduously and profitably Germany's I.G. Farbenindustrie plied those Chinese markets in the inter-war years. China is to-day said to be still ekeing out what remains of the I.G.F. Indanthrene dyestuffs, and whatever is the source of future supplies it is unlikely to be the Ludwigshafen factory.

Industry and the Home

A HIGHLY appropriate characteristic of the current Ideal Home Exhibition is the studied attempt that some industries—notably chemical, metallurgical and allied activities—have made to bring to the notice of the visitors, not only the manufactured article, but the raw material and the process from which the finished product ultimately emerges. Two stands, those of the British Iron and Steel Federa-

tion, and Manchester Oil Refineries, Ltd., in particular are deserving of congratulation in this respect. We have already referred to M.O.R.'s effort, but the BISF stand, with its diagrammatic representation of a blast furnace and accompanying photographs and iron-ore samples, is worthy of equal commendation. Not all exhibitors, however—and, surprisingly, few chemical firms—have taken advantage of this exceptional opportunity of giving many thousands some insight into the great scientific and industrial machine which is geared to the production of the familiar commodity on the shopkeeper's shelf. Such knowledge, one would say, is no less important and a great deal more palatable than many of the industrial and economic pills with which we are dosed by Government information services. The imaginative policy of the few gains special prominence from the fact that the majority have contented themselves with the "shop window" principle. It is true that they have achieved brilliant, decorative, and sometimes original displays, but basically the ideas are pre-war in conception and lack the imagination and enterprise which henceforth we are likely to need in full measure. Although the exhibition can be accounted a success if it be judged from the standpoint of attendance alone, it is more important just now for the visitor to leave Olympia with his or her knowledge of British industrial activity broadened and not merely catalogued.

Pollution Problems

BRITISH and American chemical manufacturers, dissimilar as are the economic and most other conditions in which they operate, have at least one interest in common, engendered by the approximately simultaneous recognition that a permanent remedy for wholesale pollution of rivers and streams must quickly be applied. Here Parliamentary measures being prepared lend urgency to the problem, and in the U.S.A. public opinion and legislation by a number of States is fast moving towards a Federal solution of the same sort. While chemical undertakings are only one among many sources of the noxious flow, which in the past few generations has transformed living rivers such as the Irwell once was into factory drains, the problem is essentially a chemical one and calls for chemists and chemical engineers for its solution from whatever direction it is approached. Full recognition of this is made in the U.S.A. by the recent publication by the Manufacturing Chemists' Association of its newly adopted recommendations entitled "Organisation and Method for Investigating Wastes in Relation to Water Pollution" which is well worth attention here as a full study of how the general plan of attack is being shaped there. From this it is clear that their problems are equivalent in origin and complexity to our own; and they fully recognise what has been too often overlooked in both countries hitherto —that pollution control must be considered at every stage in industrial development, research, design and plant operation, and that too much attention cannot be given to the possibilities of profitable recovery of what otherwise would rank as objectionable waste. In both countries additional filtration and other recovery equipment will be costly, and this consideration entitles the whole subject to be studied at the highest level.

BENZOL PLANT SLUDGES.

(*Continued from page 352.*)

tary sulphur sets free the element which then reacts with unsaturated hydrocarbons to give a sulphur-containing sludge. As oxygen and sulphur both belong to the same chemical family it would further appear that if sludge is to be avoided it is necessary for the benzol plant to operate on gas free from hydrogen sulphide. This conclusion, however, is by no means certain, because the Committee records experiments on the effect of elementary sulphur on gas oil containing indene in which nitrogen was used instead of air in the oxidation-sludge test, and showed that in these conditions no sludge at all would be formed. An important part of the Committee's investigations was concerned with the corrosive action of wash oils in the stripping plant. This corrosion occurred to a greater extent in plants using creosote than in plants using petroleum oil, the main cause being ammonium thiocyanate formed by a reaction between ammonia and carbon disulphide in the wash oil. Ammonium chloride has a more violent corrosive action than ammonium thiocyanate but it is found only in small quantities in wash oils.

Chemical Production in December

First Set-Back in Labour Recruitment

THE *Monthly Digest of Statistics for* February, reveals the first check to labour recruitment in the chemical industry since 1945. The total number of persons engaged in the chemical and allied industries at the end of December, 1947, was 358,100. The drop was relatively small, however, the total being only 100 less than that for November. A sudden decline in the number of women employees was chiefly responsible, the December total in this category being 115,100 compared with 116,000 in November. Male labour continued to rise, however, to 243,000 in December against 242,200 in November. Despite the reduction in women workers the number of persons engaged on export orders rose from 73,100 to 74,100 by the end of the year.

A comparison of production results for the months of November and December, reveals but small differences, although the latter figures are almost without exception higher than in the corresponding period a year ago. Steel production in January, 1948, at 281,000 tons, represents an advance of 38,000 tons on December, 1947, and of 41,000 tons on December, 1946.

On balance chemical stocks and consumption remained relatively steady during December. The respective consumption and stock figures for the December of 1946 and 1947 indicate general increases in keeping with expanding production, the most marked being sulphuric acid (consumption), agricultural lime, alcohol and refined lead. This tendency continued in January.

CHEMICAL PRODUCTION AND USES—DECEMBER AND JANUARY

	January, 1948 Thousand Tons			January, 1947 Thousand tons		
	Production	Consumption	Stocks	Production	Consumption	Stocks
Sulphuric acid	130.6	127.0†	58.5	117.6	118.0	65.3
Sulphur	—	21.9	83.9	—	18.9	64.2
Pyrites	—	20.8	58.5	—	16.7	68.0
Spent oxide	—	15.8	165.4	—	16.5	147.1
Molasses†	56.6	27.6*	239.9	44.6	28.9*	142.7
Industrial alcohol† (million bulk gals.)	1.99	2.34	7.63	2.09	2.17	2.23
Superphosphate	86.9	89.5	147.1	72.4	68.0	172.2
Compound fertilisers†	137.8	107.1	255.2	101.9	86.4	292.7
Agricultural lime†	—	445.5	—	—	186.5	—
Ammonia (weekly average)† ...	—	5.97	4.28	—	6.08	4.60
Phosphate rock (agricultural)† ...	—	72.5	125.8	—	62.8	149.6
Phosphate rock (industrial)† ...	—	5.85	46.0	—	6.53	34.8
Virgin aluminium†	2.59	12.7	—	2.64	11.0	—
Magnesium	—	—	—	0.22	0.28	—
Virgin copper†	—	27.9	110.2	—	28.8	92.3
Virgin zinc†	—	20.3	32.3	—	18.0	40.7
Refined lead†	—	18.2	40.0	—	15.1	24.3
Tin†	—	2.47	15.6	—	3.09	20.4
Zinc concentrates†	—	13.5	53.0	—	14.9	108.0
Steel ingots and castings (including alloys)	281‡	—	—	240‡	—	—

* Distilling only. † December. ‡ Weekly average.

COKE INDUSTRY DISPUTE—42-HOUR WEEK CLAIM

AFTER a meeting at Barnsley last week, delegates of South Yorkshire coke-oven and by-product plant workers, out on strike in support of a 42-hour week claim, decided by 47 votes to nine to resume work.

Mr. Arthur Horner, general secretary of the N.U.M., who travelled from London to address the meeting, said afterwards that the grievance would be dealt with by the union.

As Yorkshire workers went back, cokemen in Durham and South Wales ceased work. At Jarrow and Burnmoor the men said that the strike was not connected with the South Yorkshire dispute. Workers in South Wales stopped work against the advice of union leaders.

90,000-ton Loss

Recent stoppages in the Yorkshire coal pits accounted for a loss of over 90,000 tons. Referring to this deficit in a telegram to Mr. G. E. Tyler, organising secretary of the British Association of Colliery Managements, the N.C.B. chairman, Lord Hyndley, asked for every endeavour to be made by the workers to replace this tonnage.

More Radio Isotopes

Eight Countries Aid U.S. Research Plan

FORTY-FOUR shipments of radioactive isotopes have been sent from the United States to eight countries since foreign distribution was announced by President Truman last September. The U.S. Atomic Energy Commission, announcing this last week, stated arrangements have been made for shipments to eight additional countries; approximately 2200 shipments have been made to research institutions within the United States.

The foreign shipments were: to the United Kingdom, 12 shipments of phosphorus 32, iodine 131, iron 59, carbon 15, sulphur 35 and zinc 65; to Australia, 21 shipments of phosphorus 32, iodine 131, iron 59, carbon 14, cobalt 60, and sulphur 35; to Canada, four shipments of phosphorus 32, iodine 131, and carbon 14; to Argentina, two shipments of phosphorus 32; to Sweden, two shipments of phosphorus 32, and zinc 65; to Denmark, one shipment of iodine 131; to Peru, one shipment of phosphorus 32; to Italy, one shipment of carbon 14.

Medical & Plant Growth Studies

Radiophosphorus has been exported more than any other isotope, the Commission reported. It is used mainly in medical therapy for treatment of serious blood diseases, polycythemia vera and chronic leukæmia. Investigators are also employing this isotope in fundamental studies of plant growth, phosphorus metabolism in the body, and the use and deposition of phosphorus in bones and teeth.

Radio-active iodine has been shipped to several countries for medical treatment of thyroid disorders and for studies of the function of the thyroid gland. Isotopes of carbon, sulphur, zinc, iron and cobalt have been sent to foreign research groups for work in chemistry, physics, biochemistry, physiology and botany.

Countries applying for shipments for radio-active elements agree to forward to the commission six-monthly progress reports on the results of investigations, and agree that the material will not be used for purposes other than those shown in the request. Qualified scientists, irrespective of nationality, are allowed to visit the laboratories where the isotope investigations are being carried out and to obtain information freely concerning this work.

U.K. Coal and Steel for Holland.—Reports from semi-official sources in Holland say that 450,000 tons of coal and 30,600 tons of steel will be received from the U.K. this year.

Ideal Home Exhibition

Participation of Chemical Industry

CHEMICAL and allied industry participation in this year's Ideal Home Exhibition affords a useful reminder of how widespread are the effects of current chemical production and recent research. Almost all sections house some representative of the chemical industry. Big and small names abound from Fisons and Shell Chemicals in the Garden Sundries Section to Lewis Berger in Furnishing and Calor Gas in the Household Services Section.

Government interest is reflected by the Ministries of Fuel, Food, and Health, and the ubiquitous Board of Trade. Such official bodies as the British Gas Council and the British Iron and Steel Federation have displays in keeping with their representative functions.

Judging by the attendance last week-end and the rapid dispersal of the supply of catalogues, a record number of visitors is likely to see the exhibition this year.

SHALE WORKERS WAGE DEMANDS

CLAIMS advanced by the National Union of Shale Miners and Oil Workers were discussed by representatives of the union, and of the employers, Scottish Oils, Ltd., at a meeting on March 1. The claims are understood to include: (1) a 10 per cent increase on all basic rates of wages, and an increased cost of living bonus for all employees above ground and below ground. (2) An increase of 4 per cent on the 16 per cent bonus granted to piece rate workers provided the maximum number of shifts are worked. (3) Saturday to become payable at time and a half. (4) All labourers (whether handling shale or not) to receive equal treatment. (5) The improved conditions to date from January 5, 1948.

THE "C.A." INDEX

IN the interest of economy of paper supplies, the number of copies of THE CHEMICAL AGE *Editorial Index, July to December,* 1947, *must be confined to that for which definite need exists. The provision of unused copies, never desirable, is no longer possible. The Index, which has now been printed, will be available in sufficient numbers to supply all who need it, as an indispensable reference in bound volumes and for equivalent purposes. Subscribers are invited to notify us of their requirements and a copy of the Index will be supplied by post in respect of each subscription.*

Safety in Mines

Educational Film by I.C.I. (Explosives)

AS a contribution towards increased safety and efficiency in British mines, the Explosives Division of I.C.I., in collaboration with the company's film unit, has produced a film "Shotfiring in Coal Mines." Divided into two parts with a total running time of 85 minutes, the film deals with the storage and distribution of explosives, single and simultaneous shot-firing in gassy and naked-light mines; attention is also paid to the use of explosives in ripping work and drifting.

The full procedure in shot-firing, from the issue of the explosives to the shot-firer's examination after the detonation, has been filmed, and animated diagrams on correct and incorrect handling methods supplement the pit scenes.

Explosion Filmed

In connection with simultaneous shot-firing in drifting, skill and initiative in camera manipulation at the drift face have resulted in the successful filming of the blast in the tunnel. The producers believe that this is the first time in this country such a scene has been recorded on film and, although the cameras escaped unscathed, considerable damage occurred to the arc lights.

"Shot-firing in Coal Mines" is to be made available to mines and mining schools for instructional purposes.

Coconut-Oil Plan

Large-Scale Processing in Ceylon

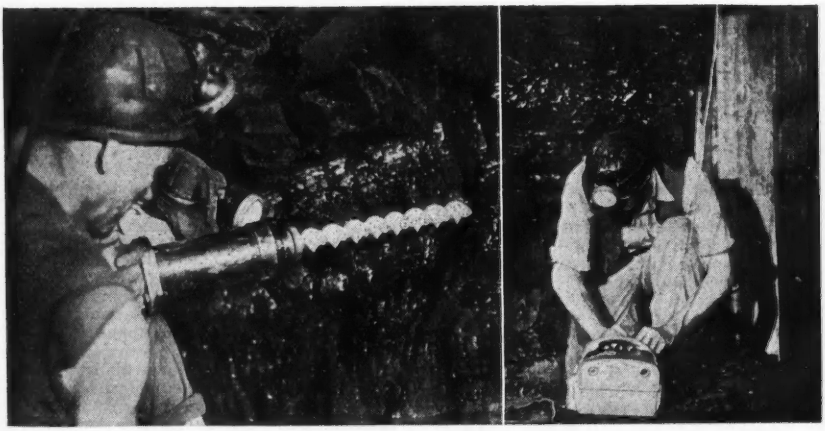
IN connection with a recent review of industrial prospects in Ceylon (THE CHEMICAL AGE, February 14), it is announced that a report on the processing of oil-containing materials has been submitted to the Ceylon Government by L. H. Manderstam & Partners, Ltd., London, and that plans are now being drawn up for development of the Island's oil processing industry. Final specifications are being prepared for a wide range of plant capable of being adapted to a variety of oil seeds.

200 Tons Copra Daily

The scheme provides for the processing of about 200 tons of copra per day by the use of up-to-date methods. This will produce a high yield of good quality coconut oil, and a valuable cattle-feeding product.

About 700 tons of the residual pulp (poonac) per day will be further processed by local industries to yield a primitive oil. Recovery from the latter will be as high as 14 per cent. This inferior oil will be converted into a high-grade fatty acid for the soap and allied industries, and for the recovery of glycerine.

The project also envisages the production of fatty alcohols. It is also intended to refine and harden the coconut oil with a view to enhancing its value in the world market.



Shots from the I.C.I. film : Hand drilling a short wall face in readiness for the charge, and (right) connecting cables from the several shot-holes to the exploder

Du Pont Breaks Records

Highest Earnings, Fewest Accidents

WITH net earnings totalling $98,891,000. after taxes, and sales totalling $783,400,000, operations of E.I. Du Pont de Nemours & Co., Inc., for the year 1947 reached the highest level of peacetime production in the company's 146-year history. This is revealed in the company's annual report, which is about to be distributed to the 91,200 stockholders and reflects a volume of operating activity approximately 17 per cent above the previous peacetime record, established in 1946. Sales of $783,400,000 for 1947 represent an increase of 21 per cent over 1946.

Holding Down Prices

Sales price adjustments made towards the end of 1946 and during 1947 have resulted in an average overall increase of 15 per cent upon the pre-war average of 1939, despite "substantial and continuing" advances in costs. Commenting on prices, Walter S. Carpenter, Jr., who was elected chairman of the board in January, observed that "one of the most vital and perplexing problems facing industry to-day is that of holding prices to reasonable levels, consistent with a fair profit margin, in the face of continually rising cost of operation."

Monopoly Charges Resisted

In issuing its annual report the company announced its firm intention to "resist to the fullest extent" the monopoly charges contained in the recent suit filed by the U.S. Department of Justice relating to Du Pont's cellophane activities. Although cellophane patents and processes originated with a French concern, it was explained that Du Pont subsequently developed a moisture-proof variety which greatly extended the usefulness of the material. Patents giving the company exclusive rights to manufacture, use and sell the moisture-proof product were granted. Despite this, the company elected to license another firm operating in the field to make and sell moisture proof cellophane in competition with Du Pont, the company said.

A notable achievement of the company's operations during the year was a new safety record of less than one lost-time injury per million-man-hours worked. This was the lowest injury rate of any year in the company's history, and represented an accident frequency rate less than one-tenth that of the chemical industry as a whole. During 1947 employment increased slightly over 1946 and totalled 75,945 at the close of the year.

Italian Resins

Generally Increased Chemical Output

DURING 1947 about 2000 tons of phenolic and 1000 tons of urea resins were exported from Italy. During the same year in comparison with 1946, the following increased outputs were achieved: Phenolic and cresylic resins 75 per cent, vinyl resins 93 per cent, acrylic and metacrylic resins 92 per cent, glycerophthalic resins 83 per cent, celluloid 100 per cent, polystyrene resins 27 per cent, urea resins 66 per cent, vinyl acetate 100 per cent, galalite 100 per cent, acetate of cellulose 83 per cent.

The demand for galalite is increasing. Normal production amounts to some 1250 tons yearly and it is sold as a raw material in the shape of sheets or slabs, tubes and rods. It is used to make objects in imitation horn, tortoiseshell, ebony, agate, etc.

* * *

Also during 1947 almost 1200 tons of tartaric acid were exported from Italy. The chief customer for this product was Great Britain, followed by Czechoslovakia and America. Before the war Italy exported about 2000 tons each year of this acid.

U.S. FIRM TO BUILD BRITISH CHEMICAL PLANT

LEVER Bros. & Unilever, Ltd., has awarded a contract to the chemical plants division of the Blaw-Knox Company, Pittsburgh, Pa., to design and construct a plant in England for the production of stearic and oleic acids, using the Emersol process. This is a continuous and automatically-controlled system that separates mixed fatty acids into their solid and liquid components by means of low temperature crystallisation from a solvent medium.

The production of the new unit, which will be erected under the direction of Blaw-Knox engineers at a cost of approximately £87,500, will be capable of producing cosmetics, chemical intermediates, cutting oils, lubricants and special soaps.

NORWEGIAN NITRATE EXPANSION

DESPITE delays due to material and exchange shortages, expansion of the new Heroya factories of the Norwegian electro-chemical firm, Norsk Hydro, is progressing steadily. Cabled information from Norway states that upon completion the Heroya plant will be Europe's largest producer of potassium nitrate, with a yearly output of 750,000 tons as against a present yearly total of 400,000 tons.

CHINA AS A CHEMICAL MARKET

Vast Potential Scope for Dyes and Fertilisers

ALTHOUGH the report of the United Kingdom Trade Mission to China in the autumn of 1946, which has recently been published by H.M.S.O. (Price 5s. net) must be read against the background of China's rapidly deteriorating economic situation—the Chinese dollar, which stood at 8000 to the £ when the Mission left, was quoted at over 440,000 in the middle of last month—it is, nevertheless, the most ample source of information available on the economic system of China. The Mission's terms of reference were, among other things, "to consider the best methods of developing trade between China and the United Kingdom during the period of transition so as to provide a firm basis for expansion and in particular to foster Chinese interest in the United Kingdom as a source of supply for both capital and consumer goods. . . ."

Although the end of civil war and a substantial economic rehabilitation are the essential conditions for the establishment of a flourishing trade between the two countries, the axiom holds good that some trade can always be done in China whatever the conditions.

Dependence on Foreign Industry

As far as the special interests of the British chemical manufacturer and exporter are concerned, a significant fact is that in 1946 China imported chemicals and pharmaceuticals worth 95,148 million Chinese dollars, and dyes, pigments, paints and varnishes, valued at 61,347 million Chinese dollars, equal to 6.3 and 4.1 per cent., respectively, of total imports amounting to 1,501,165 million Chinese dollars. Since China has no substantial production of manufactured chemicals, it requires a wide range of products which Britain is normally able to supply, including acids, alkalis, coal-tar products, potash fertilisers, phosphates, dyestuffs, pharmaceutical goods of every description, vitamin preparations, proprietary medicines and cosmetics. There is also a large-scale demand for scientific instruments and industrial scientific apparatus including, of course, laboratory equipment.

Since China is, and will for many years remain an essentially agricultural country, an increasing supply of chemical fertilisers is considered to be of the utmost importance. However, quantities employed are customarily very small in relation to acreage and existing production facilities are inadequate. Fertiliser consumption amounted in 1939 to approximately 542,000 tons (including Taiwan and Manchuria), of which 140,000 tons were used on the mainland. While China used only 673 tons per million acres, Japan used 197,000 tons.

The Mission considers the potentialities for the use of chemical fertilisers to be enormous; in Szechwan Province alone, an estimated 3 million tons are needed annually; wider use of fertilisers is capable of bringing about an increase of 30 per cent in food crops. To this end, the erection of many local factories would be required. The only fertiliser plant on the mainland, the Pukow factory of the Yungli Chemical Industries, is stated to have potentially an annual capacity of some 50,000 tons of sulphate of ammonia, but having been despoiled during the Japanese occupation, it works at the annual rate of 30,000 to 35,000 tons. A loan of some U.S. $16 million had been secured by the company from the Export-Import Bank in Washington, part of which was used for the rehabilitation and extension of the plant.

China has, however, taken over certain plants of Japanese origin in Taiwan and in Manchuria; three plants in Taiwan had a combined yearly capacity of 10,000 tons of calcium cyanamide and of 30,000 tons of superphosphate. Production of sulphate of ammonia was started during the war. Manchuria had six sulphate of ammonia plants before the war, but doubts are expressed in the report of their ability to make a useful contribution to the supply position in the immediate future.

Great Britain was China's third largest supplier of sulphate of ammonia in 1936, with shipments totalling roughly 20,000 tons, as compared with 152,629 tons exported by Japan, and 69,119 tons shipped by Germany. China's total sulphate of ammonia imports amounted to 262,393 tons and other chemical fertilisers totalled 203,671. The import programme for last year, mainly under UNRRA sponsorship, provided for some 325,000 tons.

The report states that with Japan and Germany as the principal pre-war sources of supply, prospects for U.K. manufacturers must depend on high-level decisions regulating the fertiliser industries of these two countries. "In the medium terms," the Mission points out, "China will represent an interesting market for U.K. suppliers. . . ."

Other chapters of the report of more than general interest to the chemist and chemical

(*Continued overleaf*)

India's Largest Fertiliser Project

CONSTRUCTION of the fertiliser factory at Sindri, of which preliminary details were published in THE CHEMICAL AGE, December 27, 1947, is about to commence, according to a recent statement by Dr. Syama Prasad Mookerji, Minister of Industry and Supply, in the Dominion Legislature. Resident engineers of the U.S. Chemical Construction Corporation and the Power Gas Corporation, of Stockton-on-Tees, are at the site and the necessary technicians for the erection of the factory are beginning to arrive.

Contracts will be granted for executing the big water supply scheme for supply of some 12 million gallons of water per day for boilers and process work in the factory, and for supply to the township.

For the present, only one kind of fertiliser, namely, ammonium sulphate, is to be manufactured.

Pilot plant production is forecast for the end of 1949 and full production by the end of 1950, though a running-in period of a month or two might elapse before satisfactory operating results can be achieved. Two months after this might be required in order to co-ordinate and tune in the various units to operate the whole most economically. Agreement with the suppliers of plant and machinery and the consultants, provides for the training of personnel for operating the factory. The training scheme, as it stands at present, obliges the suppliers of plant and machinery to train Indian nationals in its operation. For this purpose Indian nationals will be sent to the U.K. or the U.S.A.

The availability of gypsum is one of the main problems to be faced, the Sindri factory alone being expected to require 0.6 to 0.7 million tons a year. A rough estimate of gypsum within the boundaries of the Indian Union (including the acceding States) is about 30 million tons. Trichinopoly, in South India, is known to possess 15.3 million tons, though it is mixed with clays and limestone. The Rajputana States, Bikaner, Jodhpur and Jaisalmir contain 15.5 million tons, of which nearly 10.5 million tons are in the mines of Bikaner.

Comparisons have been drawn between the Sindri project and the existing factory at Alwaye, Travancore. While the former is being designed to produce 350,000 tons of ammonium sulphate per year, the latter can produce only 45,000 tons. The Sindri factory is to produce solely by the gypsum process, however, while the Travancore factory provides also for the sulphuric acid process, using imported sulphur.

CHINA AS A CHEMICAL MARKET

(Continued from previous page)

manufacturer are those devoted to coal and the mechanisation of mines, to iron and steel, non-ferrous metals, salt mining, scientific instruments and apparatus and textile dyestuffs.

As regards iron and steel, it is noted that the Chinese Government is determined to establish, as soon as circumstances permit, and at whatever cost, a State iron and steel industry to meet the bulk of its requirements. It is added, however, that it is unlikely that the country will, within the next few years, produce any considerable tonnages. The ancient centres of the salt industry in Szechwan and Yunnan require much new equipment, particularly steel cables, and technical advice. It may be mentioned that one of the distinctive features of salt production in the Tze-Kung area is the use of subterranean gas for boiling the brine.

Of more than usual interest are the paragraphs devoted to dyestuffs, for which China had always been an important market, not only for factory use, but also for the innumerable cottage dyehouses scattered throughout the country. In 1937, China's requirements totalled 25,559 tons, including 12,000 tons of sulphur black and 7950 tons of indigo. The leading supplier before the war was Germany, followed by Japan and the U.S.A., while Great Britain, Switzerland and France supplied relatively limited quantities.

I.G. Farbenindustrie expended much effort and large sums of money to establish a goodwill for its Indanthrene dyes. After the defeat of Japan, considerable stocks of ex-enemy dyes were taken over by the Chinese Government; less than half of these supplies had been sold at very high prices at the time of the Mission's visit. The Government has also made great efforts to get new supplies of these from Germany. It may be added that these Indanthrene dyes were made at the Ludwigshafen (French zone) plant of the I.G. The report adds that although both I.C.I. and Du Pont had equivalent products, they were unable to compete effectively against the I.G. The steps taken by the Chinese Government to maintain the goodwill for German dyes could, of course, greatly facilitate the re-establishment of German influence and dyestuffs sales in China.

SCOTTISH SPHAGNUM PEAT

by A. G. CLEMENT, B.Sc., A.R.I.C., & R. H. S. ROBERTSON, M.A., F.G.S.

FOR many years light brown, mainly sphagnum peat has been prepared for agriculture and horticulture in two well-known grades known as moss litter and granulated peat, usually supplied in 2 cwt. bales. The industry has been established on the peat mosses of the Central belt of Scotland, where over a dozen baling plants can be found, most of them, however, working on a small scale. Notable plants of recent construction are those of Peat Development, Ltd., at Lenzie, and Richardson's Moss Litter Co., at Letham Moss, near Airth.

FOR THE CHEMIST

A NUMBER of factors, but chiefly the limitation of fuel and other raw material supplies and the progress of a new technology, have recently combined to focus interest in peat, seen as a potential source of chemicals as well as of fertiliser and natural and manufactured fuel. The whole subject has now been reviewed in the latest publication by the Fuel Research Station, DSIR ("The Winning, Harvesting and Utilisation of Peat"), of which the accompanying article serves as a valuable supplement, providing additional data deserving attention of the chemical and fuel industries

It is the comparatively small size of the Scottish light brown peat bogs, which determines the scale of operations. There cannot, therefore, be a peat moss litter industry of the size or efficiency, for example, of the Hannoversche Kolonisation und Torfverwertungs A.G., Schwegermoor, near Osnabrück, which turns out 10,000 tons of bales a year; but where there is work for two baling presses the lay-out of R. Jung (B.I.O.S. Report, No. 479, p. 9) may be worth copying.

Since the publication in THE CHEMICAL AGE, August, 1946, of the previous article on peat a new sphagnum peat plant has been erected at Heatheryknowe Moss, Bargeddie, by Peat Industrial Research (Scotland), Ltd. The peat moss is cut in the Dutch manner and with an accuracy that astonishes onlookers; the blocks are air-dried during the summer months and stacked in impressive stockpiles.

At the factory they are milled to the required grist, the aim being to break the moss down to its smallest botanically recognisable units, broken apart at the weakest points. In this way the product is strongest and most resilient.

The milled peat is fed to a rotary louvre drier directly heated by the burnt gas from a small semi-circular gas plant. The drier is well instrumented and controlled by automatic dampers to prevent any untoward rise in temperature and to maintain accurate control of the moisture content of the product.

Peat chars rather quickly at 130°C., but it is permissible to use an inlet gas temperature of 400°C., since the peat is wet; however, any choking of the feed must be detected at once, otherwise the temperature will rise above charring point.

One difficulty encountered in drying, is the unusually low density of the product (packing density 0.106 g./c.c.), and the air stream in the drier requires very accurate control. Peat dust is carried over by the air stream to a cyclone collector, and any not separated from the granules in this way is removed in a screening plant.

The main forms of sphagnum peat now available commercially in Scotland are therefore as shown at the foot of this page.

Heatheryknowe peat is a relatively unhumidified peat consisting mainly of sphagnum moss with a small amount of cotton-grass occurring patchily. The colour of the dry peat is a light chocolate brown.

The chemical constituents of the peat

(*Continued overleaf*)

SPHAGNUM PEAT PRODUCTS

	Size of pieces	Type	Moisture	Main uses
Old	12 × 4 × 4 in.	Block peat	moist	Firelighters
	about 1 in. lumps	Moss Litter	to air	Stable litter
	about ⅜ in. mesh	Granulated Peat	dry	Horticulture
New	10—40 in. mesh	Peat Granules	Air dry	Insulation ceramics, molasses,
	less than 40 mesh	Peat Dust	to bone dry	fertilisers, etc. Anti-tack powder

have not been determined, partly because of the extreme difficulty of separating them for analysis and partly because most of the uses depend on physical properties. The ash content, however, varies between 2 and 3 per cent of the dry weight. The ash is off-white, and fuses about 1150°C. The soluble acidity is equivalent to 0.7-0.12 per cent H_2SO_4 when titrated with barium hydroxide using phenolphthalein as indicator.

Dr. G. K. Fraser (Geol. Survey Wartime Pamphlet No. 36, Part 1 (1943), p 21) shows *p*H values ranging from 3.5 to 4.6 for various types of peat, and 3.7 to 4.1 for sphagnum types. Heatheryknowe peat is rather acid.

The constitutional changes which occur in the progressive humidification of peat have not been investigated, but even the most recent sphagnum peats are highly carboxylated. This invites comparison with textile fibres such as jute which have a high base exchange capacity.

The exchangeable hydrogen ion content quoted by the above author is 93-129 milli-equivalents per 100 parts of oven dry peat for sphagnum types, compared with a range of 58-140 for all types. Most peats lie between 90 and 120 and in this property resemble the range of electro-dialysed pure montmorillonite clays. Both are colloidal electrolytes.

The use of peats saturated with different bases has not received much consideration, except in the preparation of fertilisers where ammonium or calcium ions are used to neutralise the acidity. It may be that a silver peat might find use in the sterilisation of water, or other metal-saturated peats might be used to give body colour to ceramics.

Moisture Relations

The equilibrium moisture content of dried peat granules is given in the following table :

Relative Humidity per cent	*Equilibrium Moisture* per cent
60	11
65	12
70	13
80	16
90	21
93	25

The values for air dried peat are a little higher. Drying to moisture contents lower than 10 per cent reduces the affinity for atmospheric moisture.

The high imbibition of air-dry granules is one of its many industrially important properties. Fraser (*op. cit.*) gives 1650 lb. of water as being re-absorbed by 100 lb. of air-dry peat of ¼ in. mesh. The property is made use of in the manufacture of deodorants and disinfectants, as with phenols for earth closets, and with hygroscopic chemicals.

On the other hand, peat dried to zero moisture content is very difficult to re-wet, and pieces immersed in water for several months have been found to have only the surface layer affected. The irreversible drying of the colloids present in peat is believed to be esponsible for this effect.

Rheological Properties

Very little has been published on the rheological properties of peat, and most attention has been paid to the water content range of 85 to 92 per cent for black peats, a range of practical interest in the design of peat harvesting and macerating machinery. In the last two years many experiments have been made over the whole range, 0 to 90 per cent of water, for sphagnum peat. Most phases of the moisture range have so far but little significance industrially, but particular attention has been paid to the physical properties of peat granules over the range of 0 to 50 per cent of moisture.

Measurements have been made of the packing density of the accurately graded granules of 10-40 mesh. Under a stress of 12 lb. p.s.i., the apparent specific gravity is 0.156, compared with 0.160 for cork ⅜ in. to ¼ in. granules. This is of importance for insulation purposes where the material is packed into a confined space under light pressure. The same test carried out with increasing pressure gave the following results :—

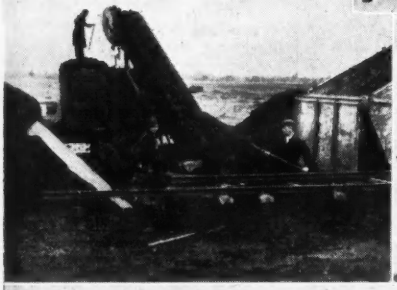
Pressure, lb./sq. in.	*Apparent sp. gr. g./c.c.*
1	0.109
10	0.143
100	0.285

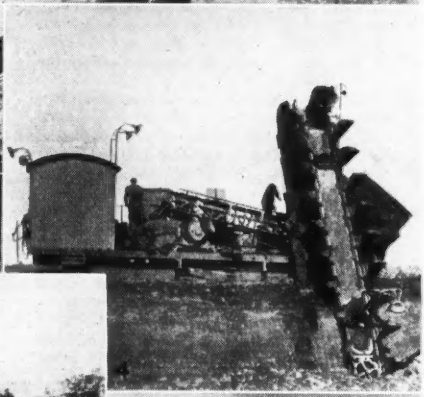
(*Continued on page 364*)

The Scottish peat industry, progressive as are its present plans, might do worse than study its counterpart in Eire, where mechanisation has been brought to a very high state of efficiency. Evidence of this is provided by the scenes reproduced on the facing page. They show :—

1. **Turf miller preparing turf mould for briquettes.**
2. **Turf harvester.**
3. **Mechanised loading.**
4. **Turf-cutting machine in operation.**
5. **Mobile crane facilitates turf stacking.**
6. **By way of contrast, the primitive prototype of the modern mechanised industry.**

MECHANISED PEAT HARVEST IN EIRE





Photographs by courtesy of the "Irish Independent"

(For description see preceding page)

In the range 20 to 70 per cent of moisture peat granules exhibit some interesting phenomena upon compression in a mould. On release of the pressure the mouldings regain considerably in volume but to different extents according to the moisture content as the following table shows :—

Moisture Content per cent	*Volume* c.c.	*Density* g/c.c.
20	83.3	0.12
30	51.8	0.22
40	65.3	0.20
50	106.7	0.15
60	111.2	0.18
70	95.4	0.28

(See graph below)

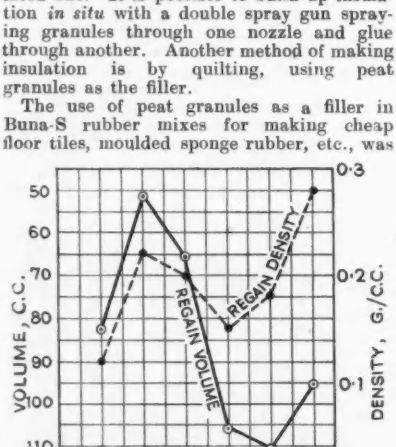
The same dry weight of peat was used throughout.

Applications

The dried peat granules are used for the production of a number of constructional materials. The lightest weight products (d 0.2) present manufacturing difficulties which have still to be overcome, but the denser products (d 0.5) provide a warm and sound-deadening material suitable for a substrate for ceramic or magnesium oxychloride floors.

The granules can be used for insulation in place of granulated cork, and a recent case may be mentioned where, during a week's test in two similar electric hot water heaters, the peat insulated one consumed 25 per cent less current than the cork insulated one. It is possible to build up insulation *in situ* with a double spray gun spraying granules through one nozzle and glue through another. Another method of making insulation is by quilting, using peat granules as the filler.

The use of peat granules as a filler in Buna-S rubber mixes for making cheap floor tiles, moulded sponge rubber, etc., was mentioned by C. W. Davis in a letter to THE CHEMICAL AGE, November 12, 1946.



Data sheets have been prepared for certain groups of uses; they resemble the data sheets for new organic chemicals. Data Sheet G.5 suggests uses in the manufacture of ceramics. It is pointed out that the granules are normally made in the sieve range 10-40 mesh, but could be supplied in closer size ranges if required, though at higher cost.

The properties of interest to a ceramist are low bulk density of peat (0.12 g./c.c.), the large specific surface, high capacity for liquids, low ash content, and the whiteness and fusibility of the ash.

The peat dust has packing density of 0.14 g./c.c., about half the absorbent capacity of the granules, but higher humic and ash contents. Suggested uses of these materials are in the production of foamed ceramics, and to impart greenstrength. The acidity can be neutralised either with sodium hydroxide, or, where inorganic additions are undesirable, with ammonia.

Granulated Peat

The use of peat granules as an anti-caking additive for use in fertilisers, and as a base for molasses is described in Data Sheet A.4. Stewart and Williams (*Scot. J. Agric.* (1942), *24*, 52-56) found that 10 per cent by weight of moss litter, a moist and coarse form of peat, was superior to ground dolomite, sand and mineral phosphate for preventing the caking of superphosphate and mixed fertilisers, even over a period as long as nine months. The Chemical Research Station is reported to have found that 5 per cent by weight of dried pulverised peat was enough to give a friable fertiliser after storage. The same volume of sand, and mineral additives did not prevent caking. The Bargeddie laboratories find that 3 per cent of their product is effective. This is probably due to the great resilience of the carefully milled granules.

The use of dried milled peat for carrying molasses in a non-tacky form is well established. The anti-tack properties may also be used in the finishing of bituminised roofing felts, tarpaulins and bitumen-coated metal pipes.

It is claimed that by eliminating baling, and by being able to use air-dry peat at a lower moisture content than is possible in a baling plant, and by having a highly efficient drying plant and labour-saving devices, the saving to the consumer of peat granules is as much as £6 per ton dry weight.

Another Data Sheet describes the use of granulated peat in oxide boxes for gas purification. The superiority of peat-oxide mixtures over bog iron ore containing little

(Continued on page 373)

JAPANESE AGAR-AGAR PRODUCTION

Simple Procedures of an Important Industry

THE first detailed and illustrated report on the production of agar-agar, an industry in which British Commonwealth countries, particularly Australia, are now interested and of which in the past Japan has enjoyed a virtual monopoly, is presented in "The Japanese Agar-Agar Industry." This is BIOS/JAP/PR/No. 814 and is issued with the usual warning against possible infringement of existing patent rights.

At the outbreak of war the Allies experienced an acute shortage of agar-agar, in spite of the fact that Australia and New Zealand took up its manufacture. The United States had also entered the field in 1937 but were severely handicapped by a shortage of suitable seaweeds. The coasts of lower California and Mexico provide the most prolific sources of suitable varieties of seaweeds.

Abundant Supplies

In Japan several types of seaweed are used for the production of agar-agar, the two most important being *Gelidium amansii* and *Gelidium pacificum*. This report includes a table detailing a full list of the species of seaweeds used in the Japanese manufacturing processes but whereas the two species previously mentioned are known as "genuine grass," the others are termed "weeds." Generally speaking, from the point of view of quality and quantity, *Gelidium amansii* is the most suitable species. The Japanese are fortunate, however, in having satisfactory sources of seaweed along the whole of the coastline of their country, the best season for collection being that between May and June.

The Japanese industry is extremely primitive in operation, requires practically no capital outlay, and the whole art of their process lies in the careful blending which produces a uniform product with a low setting point and high gel strength.

The weeds are normally collected from the ocean bed by primitive rakes but in depths up to thirty feet women dive for the material, gathering it in tubs which they then tow back to the beach. They wear no special equipment other than a pair of goggles and are reputed to be better than men for this work. Above ten fathoms men equipped with diving apparatus harvest the weed, that gathered from the greater depth being of higher quality than that obtained nearer the shore.

The seaweed is laid out on bamboo racks on the beach where it dries and at the same time partially bleaches by a natural weathering process. It is then stored until required for the next manufacturing operation. It appears that the site of the processing plant is to a large extent determined by the nature of the water supplies and by the prevailing weather conditions. Soft water only should be used for the ensuing soaking process and in this connection it is interesting to note that the Japanese tried to manufacture agar agar at Chintow in China, but the project failed owing to the unsuitable nature of the water supply.

National Bleaching

The dried seaweed is soaked in shallow bins exposed to sunlight which further bleaches the weed and assists in removing extraneous material. The period of soaking varies according to the hardness of the weed, hard weed being soaked from 12-15 hours at a low temperature. In the more modern plants a further quantity of extraneous material is removed in washing machines.

The most important part of the whole process is the boiling operation. At this stage it is necessary to blend the species correctly and to use good temperature control in order to obtain a high-grade product. The report gives full details of the times and temperatures of this boiling operation and also stresses the importance of adding sulphuric acid to the blend so that the *p*H of the final product does not fall outside the range of 6.3-7.0. If the material has a *p*H greater than 7 the jelly will not solidify satisfactorily.

The hard weeds are boiled first, then the softer varieties are added and the batch is simmered for 12 hours. The residue from the first boiling is placed in another tank and boiled again, after which a proportion of the second boiling is added to the first and the mixture simmered for a further period of about 4-6 hours.

The seaweed residue from the whole process, amounting usually to about 25 per cent of the original weight of weed is normally disposed of as fertiliser. The liquor from the boilings, containing the Gelidium jelly, is next strained and solidified after which it is dehydrated. Dehydration is carried out by successive slow freezing of the batches during the night and removal of the ice and drying during the day.

A product is thus obtained which has a low water content and which is then ready for storing or packing. The yield of agar-agar is about 23 per cent of the weight of seaweed used.

American Chemical Notebook

From Our New York Correspondent

SPECIALLY supervised tests conducted by the Bethlehem Steel Corporation reveal that the use of oxygen in open-hearth steel furnaces has increased output 20 to 50 per cent with fuel savings of 10 to 25 per cent, according to Mr. J. S. Marsh, Bethlehem engineer associated with experiments. In the Bethlehem tests some 400 heats were made with oxygen under various conditions and temperatures. On high-efficiency open hearth installation, the reduction of melting time and fuel savings were small, 8 to 10 per cent. Results vary greatly because of furnace and shop factors and use of oxygen with a large part of present installations in the industry would not appear economic, says Mr. Marsh. He revealed that Bethlehem, at Johnstown, Pennsylvania, is now building the first oxygen plant in the country for accelerating steel output. It will be completed about April 15.

* * *

Succeeding her late husband, Mr. Simon I. Patino, founder of the company, who died last April, Mrs. Albina R. Patino has been elected president of Patino Mines and Enterprises Consolidated, Inc. Her succession to the executive position in the mining enterprises which supply nearly one-third of the world's tin is in recognition of her extensive knowledge of the firm's operations and personnel. Over a period of years Mrs. Patino had been actively associated with her husband in the executive direction of the company. The Bolivian tin empire had its inception in the acceptance by Mr. Patino, when he was 35, of a prospector's claim in a grubstake. The claim turned out to hold what is still regarded as the world's largest tin lode.

* * *

A ribbon, symbolic of "His Majesty's medal for service in the cause of freedom," was presented this week to Dr. W. Albert Noyes, Jr., head of the University of Rochester chemistry department, by Sir Angus Fletcher, British consul at Buffalo, New York. Sir Angus, on behalf of the British Government, congratulated Dr. Noyes for the "valuable services rendered to the Allied war effort in various fields of scientific research and development." During World War II, Dr. Noyes headed the British-American project co-ordinating staff which was created to correlate all chemistry research in the United States and Great Britain.

The Monsanto Chemical Company has selected a site north-east of Marion, Ohio, for the establishment of a new atomic energy installation, to be erected at a cost of $5 million as part of the Atomic Energy Commission's nation-wide construction and research programme, Dr. Carroll A. Hochwalt, vice-president of the company and director of its central research department at Dayton, Ohio, and Mr. Kenneth A. Dunbar, Dayton area manager for the Atomic Energy Commission, announced last week. With construction scheduled to begin within a month, the installation—to be located on the Scioto Ordnance Works—will be used for the investigation of basic chemical problems in atomic energy. Construction, according to present estimates, will take about one year. Operation of the new installation will be administered by Dr. Hochwalt, who is also in charge of Monsanto's Atomic Energy Commission facility at Miamisburg, Ohio, 10 miles south of Dayton, which at present is nearing completion.

* * *

About 30,000 lb. of commercial titanium tetrachloride have been successfully purified by the new distillation process developed by the U.S. Bureau of Mines announced Mr. James Boyd, Bureau director, last week. Pure titanium tetrachloride, obtained in pilot plant tests, is the basic raw material needed for the production of metallic ductile titanium, a newly-developed lightweight structural material with excellent corrosion resistance, comparable in many cases to stainless steel, he said. Commercial titanium tetrachloride is generally a reddish-yellow liquid with certain impurities, such as silicon tetrachloride and small amounts of iron, vanadium, and molybdenum. Through a pre-distillation treatment with copper powder, these impurities were successfully removed, and subsequent distillation permitted the recovery of high-purity titanium tetrachloride. Details of the process are outlined in Report of Investigations 4152, entitled "Pilot Plant Distillation and Purification of Titanium Tetrachloride," which is obtainable free of charge from the Bureau of Mines, Publications Section, 4800 Forbes Street, Pittsburgh 13, Pa.

Canadian Ore Search.—After the spring thaw, Canadian geologists and mining experts will begin an iron-ore search extending over 12,000 square miles of Northern Quebec and Labrador, an area believed to contain the world's largest iron ore reserves.

LETTERS TO THE EDITOR

"Chemical Products of Coal Carbonisation"

SIR,—The series of articles by Dr. John R. Campbell on "Chemical Products of Coal Carbonisation" (THE CHEMICAL AGE, December 27-January 31) deals with a subject of great interest and importance, as you rightly stress in your editorial of January 31.

It is for this reason the more regrettable that these articles, both by direct statement and by implication, do serious injustice to the state of development of the heavy aliphatic organic chemical industry of the United Kingdom. They may also convey misleading information about the processes which are in use in this country for the manufacture of a number of products. Some specific instances may be quoted.

Dr. Campbell says, "In this country the liquid products derived from the carbonisation of coal have been the source of our organic raw materials for the last century. As a consequence, since the composition of these liquid products is essentially aromatic, developments in the field of organic research and of the organic chemical industry have during that period been concentrated largely on derivatives of benzene, toluene and their homologues." He goes on to say: "On the other hand, within the comparatively short lifetime of the petroleum industry, there has arisen in America a new branch of the chemical industry based on the aliphatic hydrocarbons" and that "The inherent difficulty in Britain is that, apart from minor petroleum deposits and a certain amount of natural gas consisting largely of methane, developments must necessarily be based on our reserves of coal."

Achievements Ignored

Whatever opinion one may have of these statements, they simply ignore the existence in this country of an industry capable of producing very large annual amounts of such chemicals as methyl alcohol, formaldehyde, ethyl alcohol, acetone, acetic acid, chlorinated solvents, polyvinyl chloride, methyl methacrylate, polythene, and many others.

Quoting Dr. Campbell on the subject of the thermal decomposition of methane "Of these products, the most attractive in this country would undoubtedly be acetylene, the chemical development of which presents such enormous possibilities and the manufacture of which cannot be long delayed if this country is to retain its position in the forefront of the chemical industry." It should hardly be necessary to point out that acetylene has been made in this country in large amounts for many years and substantial proportions of it have been used as a chemical raw material.

Progress in Ethylene

Dr. Campbell says of ethylene: "An enormous amount of work, both theoretical and practical, has been carried out on ethylene and the ground is well prepared for the development of an industry based on this hydrocarbon," and seems to imply that all that is needed now is a supply of raw material. Dr. Campbell should know that ethylene also has been made on a large scale in this country for some time. How else could the commercial development of polythene, an entirely British invention, have taken place?

What is to be made of the statement that "The field for utilisation of propylene still awaits further development, but since propylene is the most abundant of the olefin gases in natural gas, it is reasonable to expect that these developments will soon take place in America"? Dr. Campbell must be aware of the enormous scale on which propylene is already used in America as a chemical raw material. Furthermore, plans for production of chemicals from propylene have been announced by more than one British firm.

The statement is made that "Chlorination of ethylene has led to some very remarkable developments. Direct chlorination yields vinyl chloride" and the author goes on to emphasise the importance of polyvinyl chloride as a plastic; yet later he says that "The production of vinyl chloride by the combination of acetylene and hydrochloric acid is preferable to the method using ethylene and chlorine." This may be so, but Dr. Campbell ought surely to have mentioned the important fact that polyvinyl chloride has been made in this country in substantial amounts for several years.

"Acetylene will probably become the most important raw material for organic synthesis and that in the not too distant future. Its manufacture from calcium carbide was patented 50 years ago, since when it has been manufactured at intervals in this country on a small scale. The details of the preparation of carbide are well known, the requirements being coke, limestone and electric power. One ton of lime requires 0.72 ton of coke and the expenditure of

(*Continued overleaf*)

LETTERS *(Continued from overleaf)*

3.2 kW to produce 1 ton of calcium carbide." It is not at all clear whether Dr. Campbell's statement about small-scale manufacture in this country refers to acetylene or to calcium carbide. However, it should be well-known that large amounts of carbide are manufactured in this country, and acetylene has been produced here from carbide for many years for use as a chemical raw material.

In his conclusion, Dr. Campbell states "There would appear to be no good reason why such substances as nylon, synthetic resins and plastics generally should not be manufactured at coke ovens and gasworks. . . . The ground on the purely chemical side, however, has been well prepared for a very extensive development, once the raw materials become available."As Dr. Campbell must know, this country has achieved a substantial production of nylon, synthetic resins and plastics generally, based partly on raw materials from coal carbonisation. It does not follow that these products should be manufactured at coke ovens and gasworks, "thereby embracing an important and rapidly developing section of the chemical industry."—Yours, etc.,

F. H. PEAKIN.

65 Lower Teddington Road,
Hampton Wick.

The Case for Coal

SIR,—It is to be regretted that Mr. Peakin finds in the articles on "Chemical Products of Coal Carbonisation" implications against the aliphatic chemical industry which were certainly not intended. At the present time the possibilities for extensive expansion presented to this industry, which indeed has a proud record of achievement, would appear to depend very largely for their fulfilment on an adequate supply of raw materials for processing and it is extremely doubtful if the new requirements could be fully met by increased imports of raw materials such as petroleum oils for cracking to unsaturated hydrocarbons or by imposing still greater demands on our agriculture.

The principal object of the series of articles, the substance of which was presented in a lecture to gas engineers, was to bring to their notice the enormous possibilities resulting from the recovery of principally, olefins from coal gas, but the series also serves to demonstrate how there could be made available to the organic chemical industry a considerable quantity of such gases from the carbonisation industries in a manner similar to that adopted in other countries. By this means the dependence of this branch of the chemical industry on other than indigenous materials could be greatly reduced if not entirely eliminated. The alternative source of of hydrocarbons from oil refining is mentioned in the articles but, although several new refineries are contemplated, the scale of oil refining in this country is not yet very extensive. In addition, the world reserves of petroleum oil, as distinct from natural gas, appear to be rather more nebulous than the coal reserves of this country and, until chemists are able to make use of atmospheric carbon dioxide for organic syntheses, coal could furnish, even if only temporarily, the raw materials to enable the organic chemical industry to attain its future maturity.

Mr. Peakin raises some specific instances of alleged misleading information in the articles which may not be accounted for by the foregoing paragraph. Carbide and acetylene are described as being manufactured in "large amounts" in this country, with "substantial proportions" of acetylene being used as a chemical raw material. The position is that if the chemistry of acetylene is to be fully developed in Britain, much more carbide will be required or alternative sources of acetylene must be sought. Since the fact that there will be no surplus hydro-electric power available for industrial use for several years and the high cost of coal will both preclude any extensive development of carbide manufacture in this country, the various methods for producing acetylene from hydrocarbons more readily available should be thoroughly examined.

Propylene is abundantly used in America as a chemical raw material, but no less an authority than Dr. R. P. Russell of the Standard Oil Development Co., has stated (*I.P. Review*, 1947, I, 226) that this field does, in fact, await further development since progress was curtailed considerably during the war.

Finally, it can hardly be denied that there are many advantages accruing from the processing of the raw materials at the plant where they are isolated, especially if these are gaseous and cannot easily be transported over long distances.—Yours, etc.,

JOHN R. CAMPBELL.

The Royal Technical College,
Glasgow.

News and Notes From G.P.O.—More than 238 million parcels were handled by the G.P.O. during the year ended March 31, 1947. In 1938-39 the total was 185 million. A telephone service has been opened between this country and China.

RECENT ATOMIC DEVELOPMENTS

New Potential Source of Nuclear Fuel

A NEW series of man-made radioactive isotopes, including a potential source of atomic energy, was described by Prof. Glenn T. Seaborg, of the University of California, one of America's most distinguished nuclear scientists, at a dinner last week at the Hotel Pennsylvania, N.Y.C., at

Prof. Seaborg

which he received the William H. Nichols Medal of the American Chemical Society's New York Section.

The last of the four possible families of heavy radioactive isotopes to be studied, the new group consists of 14 principal isotopes, none of which has ever been found in nature, according to Prof. Seaborg. The series, he said, had been called the neptunian family, because the key member is neptunium-237.

Prominent in the series is uranium-233, a fissionable form of the element which differs only in atomic weight from uranium-235, the isotope used in making one of the early atomic bombs. Prof. Seaborg explained that since uranium-233 is formed by bombarding the element thorium with neutrons in an atomic pile, it is possible to use nature's relatively large resources of non-fissionable thorium as an indirect source of atomic energy by conversion to uranium-233.

Three of the four transuranium elements, neptunium, plutonium, and americium, elements 93, 94 and 95, are true members of the new family, while the fourth, curium, element 96, is also represented by an isotope, he noted. Other elements in the series which are not found in nature are astatine and francium, numbers 85 and 87. The neptunium isotope, from which the family takes its name, is the most stable, decaying by radioactivity at the rate of 50 per cent in two and a quarter million years.

As a result of the newly-found methods of transmutation on a relatively large scale afforded by the atomic pile, modern equipment for disintegrating the atom, and new techniques and instruments, it has been possible, Prof. Seaborg said, to compress investigation of the new family into a period of about half a dozen years, as compared with the thirty or forty years spent in unravelling the natural radioactive families.

The isotopes of the new series are characterised by their atomic weights, which, when divided by four, leave a remainder of one. For this reason the family is also called the neptunium (4n plus 1) series. The atomic weights of the three natural series, thorium (4n), uranium (4n plus 2), and actinium (4n plus 3), leave remainders of zero, two and three, respectively when divided by four.

Products of Radioactive Decay

Starting with plutonium-241, radioactive decay successively produces the following isotopes: americium-241, neptunium-237, protoactinium-233, uranium-233, thorium-299, radium-225, actinium-225, francium-221, astatine-217, bismuth-213, polonium-213, thallium-209, and lead-209, the process coming to a halt when lead-209 changes to bismuth-209, a non-radioactive material, said Prof. Seaborg. There are also five known "collateral" members of the family, thorium-233, uranium-237, curium-241, plutonium-237, and protactinium-229, whose atomic weights are divisible by four, with a remainder of one, but which do not fit into the radioactive decay chain.

The isotope uranium-233 is a very important one in the series, because it is through study of its decay products that the major number of members of the series have been investigated. This isotope has been available in milligram amounts for this purpose, formed as a result of the intense neutron bombardment of thorium in the uranium-graphite chain reacting piles.

"Still another interesting feature of this family," said the professor, "is the important isotope uranium-233, which undergoes fission with neutrons and is therefore a possible nuclear fuel. Since uranium-233 is formed as a result of the absorption of neutrons by thorium, it is possible to use non-fissionable thorium as a nuclear fuel source indirectly through the fissionable isotope uranium-233."

NUCLEAR ENERGY FOR INDUSTRY

First Use in Europe Predicted by U.S. Scientist

"IT will be 10 to 20 years before atomic energy can compete favourably with coal as a source of industrial power," Dr. Lyle B. Borst, chairman of the Nuclear Reactor Project at Brookhaven National Laboratory, Upton, Long Island, New York, told the opening session of the spring meeting of the American Society of Mechanical Engineers in New Orleans, Louisiana. Because of coal shortages abroad, he added, it may possibly become economically sound in European countries before it does so in the United States.

Operational Problems

England, for example, was directing her development toward power to relieve her coal shortage, and already had a reactor in operation from which it was expected to extract power on an experimental basis.

Industrial rehabilitation of France depended in large measure on her ability to build up a power industry. At the present time a large fraction of the coal consumed was imported at a cost of $20 per ton. Atomic power, therefore, had a greater urgency for these nations than it had for the U.S.A.

Among current problems facing the scientists was that of operating reactors at sufficiently high heat for the conventional heat engine. Dr. Borst continued: "We have looked long and hard for a trick method of getting electrical energy directly from the chain reaction. We would greatly enjoy building a chain reactor with two wires leading out to carry away the energy at a modest voltage of a million or so volts. There ought to be a way of using this energy directly. We can get some energy from a reactor directly—in fact we normally control it by this means. We can even dream up a system by which we can achieve a reasonable efficiency. The only trouble is that such a system will not support a chain reaction."

Industrial Application

Another problem was related to fissionable material economy. In the utilisation of uranium, only one atom in every 140 is the isotope U235 which undergoes thermal neutron fission. The other 139 are all U238 which absorbs neutrons to make plutonium. Principle reactors throughout the country are based on the fission of U235 and therefore the use of this material is less than one per cent efficient. Thorium is not used at all. Uranium is abundant in the earth's crust, but high grade deposits are rare. For a large-scale power industry, it was therefore necessary to use U238 and thorium as well. At such a stage, there would be enough raw materials available to operate power plants for many centuries to come.

Other industrial applications of reactors might avoid the generation of electrical power. Reactors as heat sources might be used, for instance, in metallurgical industries which require high temperatures. Fission products might be used as abundant sources of useful radioactive elements. Radium, now used for therapy, radiography, and for luminous paint, would possibly be partially replaced by artificially prepared material such as radio-cobalt.

Instruments for the control of liquid densities, liquid levels, the homogeneity of mixtures and the thickness of production items were also likely to be developed and process control maintained by means of radio-isotopes. For instance, in the steel industry, short-lived radio silicon, added to the charge entering an open-hearth furnace, would permit minute by minute control of the silicon content of the steel. Analysis for silicon could then be done by Geiger counter.

Mystery of Life Growth

Carbon 14, "queen of the radio-isotopes," was being used in several universities to study carbohydrate, fat, and protein metabolisms. "From these and other studies we might achieve a whole new concept of the living process," Dr. Borst said.

Photosynthesis, often called the most important chemical reaction in the world had been perplexing scientists for a long time, but it was hoped that with the aid of radio carbon the remaining puzzles would be solved. With such knowledge it might become possible to manufacture food on an industrial basis, from water and limestone.

Calling for industrial support of the Atomic Energy Commission's programme for industrial participation, Dr. Borst warned that "bottling up the enterprise behind a solid wall of secrecy, far from fostering, may well jeopardise the nation's security. Unless we have scientific and industrial intercommunication now we will find ourselves, years hence, in a static position—without the industrial background and development that may be our strength in the future," he concluded.

The Birth of "Alcian Blue"

Research Chemist Recalls Some Pitfalls

THE problems with which research chemists have to contend and the many unforeseen complications which arise before a new chemical product is made commercially available are generally assumed but seldom mentioned. A welcome departure from the tradition is made in the current (March) issue of "The I.C.I. Magazine," which reveals something of the long, unflagging research and some of the complications which more than once threatened to make it abortive, which was rewarded at the end of last year by the production of the perfected new dyestuff "Alcian Blue."

In an interview, Mr. N. H. Haddock, who, in collaboration with two other I.C.I. chemists, Mr. C. Wood and Mr. R. Thornton, produced "Alcian Blue," gave a descriptive account of the many setbacks experienced before this new turquoise blue dyestuff became marketable.

The new shade is likely to afford important stimulus to more than one branch of our export trade and for the past ten years, scientists of several countries have been engaged in a race to discover such a dyestuff. British chemists have won the race.

Following the discovery of the pigment "Monastral Blue," about 20 years ago, I.C.I. chemists set themselves the task of changing it chemically in such a way as to make it soluble to produce a dye possessing all the qualities of the original pigment.

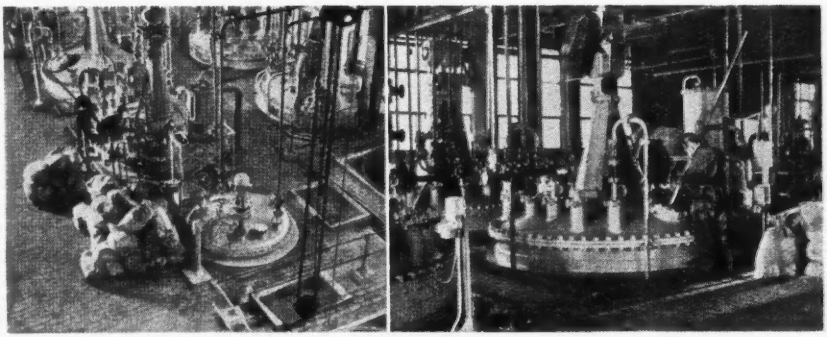
New methods were found of rendering "Monastral Blue" temporarily soluble for application to textiles in the dyeing operation, and making it insoluble again in order to obtain firm adherence to the fabric.

The first snag after making a soluble colouring matter from "Monastral Blue" occurred when the dyeing specialists reported failure in the application of the new dyestuff to cotton cloths.

Mr. Thornton, a specialist in textile printing, finally overcame this difficulty and factory production was agreed upon.

More headaches occurred, Mr. Haddock recalls, when methods had to be found of avoiding danger to workmen handling the new blue, which contains one highly poisonous chemical, and called for special treatment to render it harmless. The experts received a fright during production of the first batch. One process involved a chemical reaction developing heat and appeared to get completely out of control—until someone discovered that the cooling water had been accidently turned off at the main!

Larger Laboratories.—Substantially increased research facilities have been acquired by Mactaggart and Evans, Ltd., industrial chemical engineering, mechanical cement consultants, by the transfer of their chemical, testing and electronics laboratories to new quarters at Soudes Peace, Dorking, Surrey. The mechanical engineering section, drawing office and accounts department remain at 14 Old Queen Street, Westminster, London, S.W.1.



The source of "Alcian Blue": A bank of reaction vessels at the Trafford Park works, and (right) purification of an intermediate product

("I.C.I. Magazine" photographs)

Port Sunlight Commemorates 60 Fruitful Years

DIAMOND jubilee celebrations, curtailed in extent owing to the present economic conditions, but marking the completion of 60 years of industrial and social progress, were held at Port Sunlight last week to commemorate the foundation of the factory and the village on March 3, 1888.

Had times been normal, the occasion would have been marked by extensive expansion and improvements of the factory and possibly the village itself, but plans involving the expenditure of millions of pounds have been shelved, awaiting the time when authority is given to go ahead.

Tree-Planting Ceremony

During last week's celebrations, Lord Leverhulme, son of the founder of the factory, and Mr. G. A. S. Nairn, chairman of Lever Bros., planted acer trees on the edge of the bowling green adjoining Gladstone Hall, a short distance from the main offices, to commemorate the jubilee.

They used the silver spade presented to Mrs. Lever 60 years ago at the sod-cutting ceremony that marked the birth of Port Sunlight. Lord Leverhulme subsequently laid wreaths on the graves of his parents in the memorial crypt at Christ Church.

Lord Leverhulme using the silver spade with which the first sod was cut at Port Sunlight 60 years ago

The celebrations continued throughout the day. At noon there was a works concert attended by some 4000 people. In a short speech Lord Leverhulme recalled the scene which marked the beginning not only of the works and village but of a world-wide business. "I remember the principal actors," he said, "and can see them in my mind's eye. In fact, I was present at the ceremony myself. I must have been, because my mother performed it and I was born a few weeks later." While they commemorated the past and drew from it inspiration for the future, they were anxious not to give the impression—which would be a travesty of the truth—that Port Sunlight was a kind of museum piece, a relic of the past. Port Sunlight of the future, he predicted, would continue to provide the example and set the pace.

S.C.I. SYMPOSIUM

THE full programme of the Society of Chemical Industry (London Section) symposium on "Detergents, Wetting and Emulsifying Agents" has now been announced as follows:—

Monday, April 5, 2.15 p.m.: "Fundamental Considerations of Surface Chemistry applied to the Problem of Detergency," by Prof. E. K. Rideall; "Detergency in the Laundry," by Mr. F. Courtney Harwood and Dr. J. Powney; "Laboratory and Practical Evaluation of Detergents." Evening session (from 6.15 p.m.): "The Relation between Chemical Structure and Performance," by Dr. W. D. Scott, and "The Development of Synthetic Detergents and Future Trends," by Mr. F. H. Braybrook.

Tuesday, April 6, 2.15 p.m.: "Surface Active Agents in Aqueous and Non-active Media," by Mr. H. Lomas, and "Theory and Practice of Metal Degreasing in Aqueous Media," by Mr. P. H. Liddiard. Evening session (from 6.15 p.m.): "The Rôle of Surface Active Compounds in Emulsion Polymerisation," by Dr. H. P. Standinger; and "The Breaking of Oil Emulsions with Synthetic Detergents," by Dr. A. S. C. Lawrence.

The organisers remind intending visitors that the symposium is to be held in the Mathematics Lecture Theatre, Royal College of Science, S.W.7, and not, as stated in the syllabus, at the Institution of Electrical Engineers.

PARLIAMENTARY TOPICS

QUESTIONED in the House of Commons on Monday on the supply of steel scrap from Germany, Mr. G. R. Strauss said that this year two contracts involving the supply of 150,000 tons had been signed. He did not consider that deliveries had been up to expectations, and added that although the question of price may have been partly responsible, he did not think it a major factor. With regard to future supplies, Mr. Strauss said the outlook was serious despite a recent improvement in the general situation. He had accordingly decided to appoint a committee of three members to consider and report on measures to be taken to secure increased supplies. Membership would be as follows: Sir Graham Cunningham (chairman); Lieut.-Gen. Sir Kenneth Loch and Dr. R. E. Slade.

Brunei Crude Oil.—Shipments of crude oil from Brunei in 1947 totalled 1.7 million tons (as against .7 million tons in 1938) from which products valued at £6.25 million were obtained. Had these supplies not been obtainable, a dollar expenditure to that extent would have been incurred.—Mr. H. T. Gaitskell.

Teaseed Oil Imports.—Asked to give details of a recent shipment of teaseed oil to this country, Mr. J. Strachey, Food Minister, said that importation is under licence by private firms. The Ministry did not allocate supplies.

Carbide Sludge.—In reply to a question as to whether "the large amount of carbide sludge in the country" could be used on the land, as in Algeria, Mr. T. Williams said he was aware that a quantity of this material was available, and farmers were in fact using it to a limited extent. Apart from its cheapness, however, there was little to recommend it when compared with other liming materials such as ground limestone and ground chalk.

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16 m. Tons of Export Coal.—At a press conference last week, Mr. H. T. Gaitskell stated that the National Coal Board had been told to allocate between 15 and 16 million tons of coal for export during the current year. This would add between £30 and £40 millions to the credit side of our balance of payments. Countries on the coal export list are: Argentina, Canada, Eire, Portugal, Sweden, Switzerland, Denmark, Italy and Holland.

Textile Examinations.—The annual examinations of candidates for the Associateship of the Textile Institute have been arranged as follows: Preliminary: Saturday, April 3; General Textile Technology: Saturday, May 29. The examinations will take place at various centres throughout the British Isles, and in several overseas countries, particularly in the Dominions.

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CHEMICAL PLANT FOR WALES

FORMALDEHYDE production at Mold, North Wales, may shortly begin as the result of a project by a West Bromwich firm, Synthite, Ltd.

The disused Alyr Tinplate Works are to be converted and men are already working on site clearance. Most of the initial difficulties which delayed the firm's plans have now been overcome and preliminary steps, including the removal of Army store dumps, the felling of a 110-ft. chimney stack and water boring operations have all been successfully completed.

Mr. W. J. Hammond, a director of the firm, states it is still too early to say when production will begin or the number of employees required. Previous reports have suggested that work will be available for about 100 men and a small number of women.

SCOTTISH SPHAGNUM PEAT

(*Continued from page 364*)

organic matter has now been clearly established, and they are in use in many of the largest industrial gas-producing units in this country.

A number of municipal gas works are said to be contemplating changing to peat-oxide mixtures in view of their better performance, and greater ease of handling. The partial substitution of oxide by peat would involve a very large saving in imports and shipping space.

Although there is nothing new about peat fertilisers and a number have been on the market for many years, Peat Industrial Research (Scotland), Ltd., justify the introduction of their "Compopeat" with the claim that it embodies much of the recent work on compost-making and availability of nutritional elements.

The use of peat for soil improvement although now very well known is a discovery dating back no more than three decades. It was the work of the John Innes Institution just before the war which definitely established its *bona fides* and importance in improving the tilth of the soil.

The utilisation of peat has aroused great attention on several occasions in the past; the present attempt to develop new uses for it, being based on scientific lines seems more likely to attain a lasting success than many of the previous inventions, and may well be the precursor of a large industry based on the vast untapped reserves of this new material.

German Industry

Importance of British Zone Output

THE importance of the British zone to the other occupation zones of Germany is the subject of a report in the Canadian publication *Foreign Trade*. In addition to containing a greater population (34 per cent before the war) in 1936 the zone accounted for 75 per cent of the German hard coal, 70 per cent of steel output, and 60 per cent of liquid fuel production. Other industries in which production exceeds that of the other zones include chemicals, non-ferrous metals, rubber, and textiles.

Recovery Retarded

Although the recovery rate in the British zone has not in some instances been so rapid as in the U.S. zone, total outputs are much higher. In January, 1946, industrial production amounted to 27 per cent of the 1936 figure. In February, 1946, it was only 26 per cent, rising to 37 per cent in August. In August, 1947, iron and steel production rose to 266,000 tons as a result of increased coal allocations.

There have, however, lately been a number of indications of individual revival of activity in the various zones. The Soviet Russian zone is to receive 80,000 tons of superphosphate fertiliser from Holland during the 1948-49 season in return for the same quantity of 40 per cent potassium, to cover about 25 per cent of Dutch requirements.

The Chemical Works Griesheim have taken up the manufacture of electrodes in co-operation with the Bitterfeld and Meiningen graphite factories in the Russian zone. Monthly output is estimated at 900 tons from about 40 per cent of manufacturing capacity. The Siemens Works at Ratibor, a former main producer, is now situated in Poland.

Henckel Works Progress

The German Henckel Works, a well-known manufacturer of washing powders, etc., is again producing at a monthly rate of about 4400 tons. It is the largest works of its kind in the Russian zone, and uses "Mersol" to overcome the fat shortage. The former Thompson Works in Wittenberg, which now belongs to the Henckel group, has been renamed Industrial Work Elbe-Chemie, and is stated to employ about the same number of persons as in 1939.

Oil Exploration in Cuba.—The Cuban Government and a group of U.S. oil men, headed by Mr. R. D. Philips, of Philips Bros., Baton Rouge, La., have signed an agreement which proposes an expenditure of $10 million for oil exploration and development.

U.S. Chemical Plant

Big Contracts for New York Engineers

FURTHER steps towards self-sufficiency by countries previously dependent to a very large extent upon foreign supplies of certain chemicals have lately been reported in New Cork. Colombia and India are concerned in proposed new chemical plant production schemes, and contracts in both countries are to be carried out by H. K. Ferguson Co., Ltd., of New York.

Dr. Juan de Dios Ceballos, director of the Colombian Government agency in charge of national industrialisation, has stated that an $8,700,000 expansion programme for the Colombian alkali industry has been drawn up with the object of securing self-sufficiency.

Expansion at Bogota

Under a contract signed with the H. K. Ferguson Company, present small-scale facilities for soda ash production will be largely augmented, and further plant will be provided near Bogota for caustic soda, chlorine, refined salt and coke. On completion output will be 100 tons of soda ash, 25 tons of caustic soda, 200 tons of salt and ten tons of chlorine daily. In addition, other facilities to be erected include a power plant, water purification and pumping plants, and a brine pipeline.

Colombian industries expected to benefit from the expansion are fertilisers, glass, soap, oil refining, tanning, carbonated beverages and pharmaceuticals.

Dr. Ceballos and his associates also envisage the establishment of a Colombian steel industry, the proposed plant to include a blast furnace with a 300 tons daily capacity and pig-iron production facilities with a daily output of 8000 tons.

Indian Chlorine Plant

Construction of new chlorine plant in India for the Delhi Cloth and General Mills Co., Ltd., has already been commenced by H. K. Ferguson Co. A daily production of five tons of liquid chlorine is expected by 1949 and the new plant will also produce caustic soda and hydrochloric acid. All the output will be used for industrial purposes in the Delhi area.

Although daily production of five tons of chlorine is not large by Western standards, it is a considerable amount in the Far East where chlorine production is extremely limited. The design for the new plant provides for a future increase to 10 tons daily.

Bauxite in Australia.—Considerable bauxite deposits are stated to have been discovered in Inverell, New South Wales.

PERSONAL

MR. F. R. WIX, a director of Phosphur Bronze Co., left £39,982.

LORD LEVERHULME has been re-elected president of the Birkenhead Chamber of Commerce.

DR. MORRIS REED has been appointed chief radio engineer of the Mitcham works of Philips Electrical, Ltd.

MR. W. R. BESWICK, MR. C. ROBSON, and MR. R. W. RUTHERFORD have been appointed additional directors of the Power Gas Corporation.

MR. THOMAS GEORGE MARSH, of Pedmore, Stourbridge, Worcestershire, mining engineer and explosives agent, who died on January 9, left £152,742.

MR. GEORGE DOUGLAS, of Farfield Hall, Addingham, Yorkshire, a director and late chairman of the Bradford Dyers' Association, left £391,248.

MR. D. A. WALLACE, for almost thirty-six years secretary of Dent & Company & Johnson, scientific instrument makers, Linwood, Paisley, has recently resigned.

The degree of Doctor of Science has been conferred upon DR. ALFRED C. G. EGERTON, university professor of chemical technology in the Imperial College of Science and Technology, London University.

MR. L. A. ELGOOD, a director of the Distillers Company, is leaving Edinburgh in May for a three weeks' business tour of the U.S.A. He will make a survey of trading prospects on the Eastern seaboard and elsewhere.

A biography of the late VISCOUNT LEVERHULME, in which Mr. Harley Williams examines three dynamic personalities—the others being Woodrow Wilson and Andrew Carnegie—will appear in *Men of Stress*, shortly to be published by Jonathan Cape.

DR. E. W. FELL has been appointed senior assistant in metallurgy at the Bradford Technical College. He was educated at Haileybury and the Universities of Birmingham, Aachen and Cambridge, and has had many years of experience in metallurgy.

MR. A. E. VINCENT, North-West divisional officer of the Iron and Steel Trades Confederation, has been appointed joint deputy chairman of the North-West Regional Board for Industry. An employers' representative will shortly be nominated as the other deputy chairman.

DR. CYRIL J. W. HOOPER, who has been appointed editor and general secretary of the Society of Dyers and Colourists, is a former student of the Royal College of Science, where he obtained the degrees of A.R.C.S., B.Sc. with Honours in Chemistry, and Ph.D., D.I.C. in Physical Chemistry. He was subsequently reader with Charles Griffin & Co., Ltd., for whom he edited a wide range of scientific and technical text-books, tutor in chemistry at University Correspondence College, Cambridge, and latterly librarian and information officer in the research and development department of Ascot Gas Water Heaters, Ltd.

MR. DAVID F. TANNER, formerly in charge of the costing and statistical department of Barr & Stroud, Ltd., Glasgow, manufacturers of precision instruments, has been appointed assistant administrator with Albion Light Metal Products, Ltd., Dundee.

PROF. E. C. DODDS and PROF. J. W. COOK who visited the Chemistry Congress in Chile from March 1 to 7 as delegates of the Royal Society, lectured for the British Council on March 9 and 10 in Buenos Aires on their return journey. Prof. Dodds (director of the Courtauld Institute of Biochemistry at the Middlesex Hospital) lectured on "Synthetic Ostrogens in Medicine and Biology." Prof. Cook (Regius Professor of Chemistry and director of the Chemical Laboratories at the University of Glasgow) spoke on "Recent Work in Organic Chemistry at Glasgow." Both professors may also be able to lecture for the British Council in Chile.

Electricity Appointments

Further appointments to membership of Area Electricity Boards announced by the Minister of Fuel and Power include: MR. GEOFFREY ELEY (deputy chairman and financial director, British Drug Houses, Ltd.), London area; MR. HENRY F. SHERBORNE (managing director, Yorkshire Copper Works, Leeds), Yorkshire area; MR. J. H. BINGHAM (formerly financial adviser, British Steel Corporation, and chairman Sheffield Education Committee) Yorkshire area.

Disinfectant Manufacturers' Association

At the annual general meeting of the British Disinfectant Manufacturers' Association held last week the following officers and executive committee were appointed for the ensuing year: Chairman, MR. A. J. BLACK; vice-chairman, MR. R. G. BERCHEM; treasurer, MR. V. G. GIBBS; executive committee: MESSRS. A. E. BERRY, L. C. BETTERIDGE, P. J. BOVILL, J. H. CHAPMAN, W. ELLIOTT, W. MITCHELL, W. MORGAN-THOMPSON, J. E. WELLS. Secretary, MR. A. WILLIAMS, 166 Piccadilly, London, W.1.

Next Week's Events

MONDAY, MARCH 15

Society of Chemical Industry (Yorkshire Section). Chemistry Lecture Theatre, University, Leeds, 6.30 p.m. Annual General Meeting. R. Burgess: "Moth-Proofing."

Royal Institute of Chemistry (London and S.E. Counties Section). County Technical College, Essex Road, Dartford, 7.15 p.m. A. Albert: "Physico-Chemical Concepts in Interpreting Drug Action." (S. Wales Section). Mining and Technical Institute, Llanelly. W. H. J. Vernon: "The Corrosion of Metals."

Electrodepositors' Technical Society. Northampton Polytechnic, St. John Street, Clerkenwell, E.C.1. Dr. S. Wernick: "Electropolishing."

University of Birmingham Chemical Society. University, Edgbaston, Birmingham, 15, 4.30 p.m. Dr. Geoffrey Gee: "Certain Aspects of the Chemistry of Rubber."

Royal Society of Arts. John Adam Street, Adelphi, W.C.2, 4.30 p.m. Prof. E. K. Rideal: "Colloids." (Cantor Lecture).

TUESDAY, MARCH 16

Society of Chemical Industry (Plastics Group). Burlington House, Piccadilly, W.1, 6.30 p.m. R. G. R. Bacon: "Redox Catalysis for Polymerisation Processes." (Chemical Engineering Group). Rooms of the Geological Society, Burlington House, Piccadilly, W.1, 5.30 p.m. A. D. Davidson: "Heat Transfer."

The Royal Institute of Chemistry (Sheffield, South Yorkshire, and North Midlands Section). Chemistry Lecture Theatre, University, Western Bank, Sheffield, 6.0 p.m. A. L. Bacharach: "Penicillin."

Institution of the Rubber Industry (London and District Section). Caxton Hall, Caxton Street, S.W.1. Dr. D. A. Harper: "The Technology of Some New Condensation Rubbers." (Scottish Section). Chamber of Commerce Rooms, 21 Charlotte Square, Edinburgh, 7.0 p.m. Annual General Meeting.

Plastics Institute (North-Eastern Section). Neville Hall, Newcastle-upon-Tyne, 6.30 p.m. H. R. Poole: "Silicone Plastics."

Chadwick Public Lectures. Sir Edward Meyerstein Lecture Theatre, Westminster Hospital Medical School, 17 Horseferry Road, S.W.1, 2.30 p.m. J. R. Nicholls: "Adulteration of Food and Its Detection."

TUESDAY, MARCH 16-18

Institute of Metals. Institution of Civil Engineers, Great George Street, S.W.1. Annual General Meeting.

WEDNESDAY, MARCH 17

Royal Institute of Chemistry (London and S.E. Counties Section) and **Institute of** Physics (London Branch). Royal Institution, Albemarle Street, W.1, 2.30 p.m. Dr. A. E. Alexander: "Emulsions & Emulsification."

Plastics Institute (Southern Section). Polygon Hotel, Southampton, 7.30 p.m. Dr. S. J. Skinner: "Vinyl Paste Polymers."

Society of Chemical Industry (Food Group). Wolverhampton Technical College, 2.15 p.m. E. B. Hughes and J. C. L. Resuggan: "The Chemical Sterilisation of Food Plant."

Northampton Polytechnic. St. John Street, E.C.1, 7.0 p.m. Dr. J. H. Partridge: "The Manufacture and Properties of Glass."

THURSDAY, MARCH 18

Royal Institution of Great Britain. 21 Albemarle Street, W.1, 5.15 p.m. Sir Lawrence Bragg: "Current Research Work in the Cavendish Laboratory."

Oil and Colour Chemists' Association (London Section). Lecture Room, Royal Society of Tropical Medicine and Hygiene, 26 Portland Place, W.1, 7.0 p.m. Dr. L. Ivanovsky and Dr. A. C. Healey: "The Uses of Greases and Waxes in Printing Ink and Related Materials."

The Chemical Society. Lecture Theatre, Physical Chemistry Laboratory, South Parks Road, Oxford, 12 noon. 107th Annual General Meeting. 3.0 p.m. Prof. C. N. Hinshelwood: "Some Aspects of the Chemistry of Hydrocarbons."

Royal Institute of Chemistry (Bristol and S.W. Counties Section). Chemical Department, The University, Woodland Road, Bristol, 5.30 p.m. J. F. Clark: "The Public Analyst Overseas." (East Midlands Section). St. James's Restaurant, Derby, 7.15 p.m. Prof. Idris Jones: "Modern Industrial Development and Research in Relation to the Scientific Department of the National Coal Board." (Liverpool and N.W. Section). Widnes, 7.0 p.m. Dr. A. E. Gillam: "Absorption Spectra as Chemical Tools."

Institution of Mining and Metallurgy. Geological Society Apartments, Burlington House, Piccadilly, W.1, 4.15 p.m. General Meeting.

FRIDAY, MARCH 19

Royal Institute of Chemistry (S. Wales Section) and Institute of Petroleum. Britannic House, National Oil Refineries, Llandarcy. Scientific Film Show.

James Watt Memorial Institute, Great Charles Street, Birmingham, 3. Dr. J. Hofton: "Melamine Resins."

SATURDAY, MARCH 20

Institution of Chemical Engineers (North-Western Branch). College of Technology, Manchester, 3.0 p.m. N. T. Gridgeman: "Value of Statistics to the Chemical Engineer."

Home News Items

New Petroleum Publication.—*British Petroleum Equipment News* is the title of a new quarterly magazine published by the Council of British Manufacturers of Petroleum Equipment, price 2s. 6d.

Pharmacy Wages Increase.—Commencing last Monday, workers in the pharmacy trade received pay increases and will work shorter hours under an agreement reached with the Retail Pharmacy Joint Industrial Council. The agreement is operative for six months.

Copra Talks in London.—The Ministry of Food is shortly to have talks with Ceylon Ministers (Mr. J. R. Jaywardene and Sir Oliver Goonetilleke) on copra supplies and prices. The existing contract is due to expire at the end of 1950, and Ceylon is believed to be seeking higher prices.

U.S.A. Firm Invites Exports.—The J. L. Hudson Company, Detroit, invites U.K. manufacturers to supply goods for its departmental store. Hudson's resident manager in Europe, who frequently makes buying trips throughout the European market, is Mr. John B. Millas and his London office is at 62-64 Brook Street, W.1.

Exhibition Date Changed.—The Engineering and Industrial Equipment (Home and Export) Exhibition will be staged at the Royal Horticultural Hall, London, S.W., between May 19-28, instead of in March as was originally intended. This will enable some important exhibitors to complete new products and equipment.

Miners Beat Target.—British miners last week produced their biggest coal output since August 1940, a total of 4,269,800 tons. This is slightly more than the weekly average needed to reach this year's target of 211,000,000 tons. Absence of major strikes added 175,000 tons to the previous week's figure.

Easy On The Eyes.—After experiments to decide which colours were most conducive to efficient work and restful to the eyes, many machines at the Dart Mill, Bolton, have been repainted turquoise blue and light brown. The employees, engaged on cotton cloth production, state the new colours relieve eye-dazzle.

U.S. Information Service.—The United States Information Service, which has been situated for the past two years at 33 Davies Street, W.1, is now in the American Embassy Building, No. 1 Grosvenor Square, W.1. The American Library, which has been situated at the Davies Street address, has closed temporarily. It will re-open probably early in April.

German Scrap Steel.—A consignment of scrap steel including gun barrels and other armaments, arrived at Grangemouth recently in five vessels from German ports. Most of the scrap will be utilised by a Glasgow steel firm.

No Palestine Parcel Post.—The parcel post service to Palestine is temporarily suspended and postal orders may no longer be sent to Palestine or Transjordan. Parcels may, however, be sent to the British Forces in Palestine and to the Palestine Police Force.

Ethylene Gas Equipment.—Consequent upon successful commercial-scale tests on ripening tomatoes with ethylene gas, Stewart King Industries, London, is to produce plant and apparatus to equip a number of ripening chambers for the use of market gardeners and fruit-growers.

Prefabricated Factories.—An order worth £1 m. for the supply of 700 prefabricated steel factories for Argentina has been received by a Tyneside firm, Cussins (Contractors), Ltd. Each of the factories will be about 200 feet long and completion of the order is expected in about three months.

Potential Poison.—The Ministry of Food warns the public that the packeted product labelled "Stafford Starch" concentrated and manufactured by Best-Pax, Ltd., must on no account be used in food of any kind. Considerable quantities of this product at present on sale contains a dangerous poison —barium carbonate—introduced inadvertently.

More Fuel Sacrifices.—Lord Hyndley, National Coal Board chairman, told a fuel economy committee at Carlisle last week: "We may have to ask you to make great sacrifices during the coming summer—it may be in quality, and certainly it must be in fuel economy—so that we can save for what I believe we ought to export."

Port Sunlight Fire.—Three tons of coconut cake meal and part of a wooden and metal meal cooler were destroyed by fire last week at No. 2 oil mill at Lever Brothers' Port Sunlight works. The outbreak was extinguished by the works' fire brigade, members of which were engaged for nearly two hours in emptying the contents from the cooler.

Students Visit Factory.—Students from Queen Mary College visited Glaxo Laboratories, Ltd., last week. They were received by Mrs. R. Denston, B.Pharm., Ph.C., and afterwards visited various sections of the factory including the biochemistry, physical chemistry, microanalysis, investigation and development, tablet manufacture and microbiological assay departments.

NEW INDIAN TARIFF

THE Indian Customs Tariff, as in operation on January 1, 1948, contains a number of revised tariff values for the purposes of assessing customs duty. The chemical items to which new values apply are shown

Chemical	Rs.	A.	P.	Per
Ammonium carbonate or bicarbonate	34	0	0	cwt.
Ammonium chloride—				
Salammoniac, sublimed ...	34	0	0	,,
Copper sulphate	36	0	0	,,
Soda, caustic, flake, petal or powder	20	0	0	,,
caustic, solid	18	0	0	,,
Sodium hydrosulphite	70	0	0	,,
Sodium sulphide	21	0	0	,,
NOTE—The tariff value of Rs.20 per cwt. for sodium thiosulphate (Hypo) is deleted.				
Soda ash in bags including calcined natural soda and manufactured sesqi-carbonates	8	0	0	,,
Acetic acid	0	10	0	lb.
Borax, granular, powdered or crystalline	23	0	0	cwt.
Boric acid	42	0	0	,,
Sodium bicarbonate	11	0	0	,,
Asafoetida, coarse (hingra) ...	150	0	0	,,
N.B.—The tariff values apply to articles packed in containers of not less than 14 lb.				
Cuttle fish bone	17	0	0	,,
Alizarine, moist—				
(*a*) not exceeding 16 per cent	200	0	0	,,
(*b*) over 16 per cent, not exceeding 20 per cent ...	225	0	0	,,
(*c*) exceeding 20 per cent ...	450	0	0	,,
Alizarine, dry—				
(*b*) exceeding 40 per cent ...	10	8	0	lb.
Congo red	4	0	0	,,
Vats—				
(*a*) Indigo (*i.e.* pure Indigo in its various concentrations) ...	4	8	0	,,
(*b*) Indigo solubilised, including indigosol O and Soledon Indigo LLs.	18	0	0	,,
(*c*) Carbazole blue	12	0	0	,,
(*d*) Solubilised and stable vat dyes such as Indigosols, Soledons and similar products, excluding those falling under group (*b*) above	50	0	0	,,
(*e*) Other sorts—				
(1) Paste	12	0	0	,,
(2) Powder	38	0	0	,,
Aniline salts	1	12	0	,,
All others (*i.e.* other than coupling dyes of the naphthol group, sulphur black, Metanil yellow, and aniline oil)	5	0	0	,,
Citronella oil, natural, from the Far East...	6	0	0	,,

Powder Metallurgy Conference.—Several British firms will attend the International Powder Metallurgy Conference to be held under the auspices of the Association of Austrian Chemists, at Graz, Austria during July 12-16. There will be lecturers on the problems of scientific, industrial and economic aspects of powder metallurgy and allied subjects.

ANTI-CORROSIVE MATERIALS

NEWS of two new materials possessing greatly enhanced corrosion-resistant properties is contained in the February issue of *Industrial and Engineering Chemistry*.

The first of these, a new type of glass, contains no sand, and is said to resist corrosive attacks of hydrofluoric acid and uranium pentoxide; its principal constituent is phosphorous pentoxide. Storage and shipment difficulties normally associated with hydrofluoric acid may be considerably reduced by the use of this material and there are great potential advantages for its use in the manufacture of laboratory equipment.

Stainless Alloy

Possibly of equal importance to the chemical industry is Carpenter Stainless 20, produced by the Carpenter Steel Co., Reading, Pa. The newness of the alloy arises only from its production in wrought form, since it is otherwise of similar chemical composition to Durimet 20, of the Duriron Co., Inc., Dayton, Ohio. The chemical composition is given as nickel 29 per cent, chromium 20 per cent, copper 3 per cent (minimum), molybdenum 2 per cent (minimum), carbon 0.07 per cent (maximum), silicon 1 per cent, and manganese 0.75 per cent

THE COMPANIES ACT

THE Board of Trade has appointed July 1 next as the date on which all the provisions of the Companies Act, 1947, not then in force will have effect.

The same Order has brought into force Section 120 (2) of the Act which empowers the Board of Trade to make regulations altering or adding to the provisions of certain schedules to the Companies Act, 1929. Under these powers, regulations have been made with effect also from July 1 next, amending Table A and the form of annual return.

The revised Table A and form of annual return will be included in the schedules to the Bill to consolidate the Companies Acts which was introduced in the House of Lords on Monday.

The Companies Act, 1947 (Commencement) Order, 1948 (S.I., 1948, No. 439) came into force on March 2. The Companies (Articles of Association and Annual Return) Regulations, 1948 (S.I., 1948, No. 434) come into force on July 1, 1948. Copies of either are available from H.M.S.O., priced 1d. and 9d. respectively.

Customs Duty Change—Hungary.—In order to facilitate imports of raw materials needed for her three-year reconstruction plan, Hungary has decided to abolish Customs Duties on such commodities.

Overseas News Items

New Turkish Oil Find.—According to press reports from Ankara, American engineers, prospecting for the Turkish Government, have discovered new oil deposits in South Eastern Anatolia.

Russo-Finnish Synthetic Fibres Co.—A joint Russo-Finnish company for the manufacture of synthetic fibres, the Viskoosa, Ltd., has recently been formed in Helsinki, with a share capital of 400 million Finnish marks.

Krupp Plants Close.—Within the next few days all Krupp plants will cease production according to an announcement by the vice-chairman of the Krupp Production Council, Herr Degel. Staffs will dismantle the plants or be put at the disposal of the labour exchanges.

Dust Laying Compound.—A new chemical compound claimed to reduce the quantity of air-borne dust in underground mining operations has recently been marketed by the Johnson-March Corporation of America. The compound treats water in such a manner as to increase its dust-laying capacity and is used in the form of 8-in. cartridges, each treating 1000 gallons of water.

Plastics Factory Explosion.—Reports from Waltham, Massachusetts, on March 7, state that a violent explosion blasted a plastics factory and shook the countryside for miles around. At least one man was killed and 29 men are in hospital. Five other workers are reported missing. The explosion and fire left the plant of the Interlake Chemical Corporation a seared mass of girders and heavy machinery piled eight feet deep.

Oil Officials Recalled.—Six British administrators of Astra Romana—the largest oil company in Rumania—have been told to leave the country at once. The Royal Dutch Shell Company, majority shareholders in Astra Romana, after stating that the Rumanian concern is "in a state of forcible dissolution" added that the decision to withdraw was due to many acts of interference by the Rumanian Government.

Bolivian Oil Development Plans.—The State-owned Bolivian oil company is proposing intensified drilling in the Camiri field, the laying of a 330-mile pipeline from Camiri to Cochbamba (with a branch-line to Sucre), and the erection of two refineries, one at Cochbamba, the other at Sucre. The cost of this programme, $14.15 million, is being financed mainly by an Export-Import Bank credit of $8.5 million, and a credit by the Bolivian Central Bank of $5 million.

Australian Sulphate of Ammonia.—The Electrolytic Zinc Co. of Australasia, contemplates erecting a sulphate of ammonia plant at Risdon, Tasmania. It will cost about £A2.5 million and produce 50,000 tons annually.

Czech Factories Nationalised.—Included in over a thousand enterprises to come under national administration since the Communists obtained power in Czechoslovakia, are 244 distilleries and 92 pharmaceutical concerns.

U.S. Steel Output Record.—U.S. production of steel ingots and castings in January reached the record peace-time figure of 7,463,000 tons net, compared with 7,213,000 tons in the same month of 1947. The highest total was reached in 1944 with 7,593,000 tons net.

Indian Oil-From-Coal Plan.—The Indian Council of Scientific and Industrial Research has recently established a special committee to consider the manufacture of oil from coal. The Ministry of Industry and Supply has already made arrangements for Indian coal to be tested in the U.S.A.

Palestine To Make Asbestos Sheets.—An asbestos sheet factory is stated to have been set up in Petah Tikva near Tel Aviv by a firm called Olamith. It is planned to produce 13,000 sq. m. per day. The manufacture of asbestos pipes is contemplated later. Raw material is to be shipped from Cyprus, and the machinery from Italy.

Ruhr Coal Price Up.—At a meeting of the Co-ordinating Committee of the Control Council in Berlin last week, the British delegation stated its intention to raise the selling price of Ruhr coal by 15 to 23 marks per ton, and to apply other increases to iron, steel, chemicals, synthetic oil, gas, and electric power.

JAPANESE IMPORT NEEDS

THE following is a revised list of goods which Japan is interested to purchase from private traders, states the *Board of Trade Journal* dated March 6. Many of the goods listed are, of course, still subject to overriding export restrictions and regulation in the United Kingdom:—

Animal glue (crushed bone, sinews and hide fleshings), asbestos, bauxite, borax, carbon black, dyes and toners (acid, basic, direct, chrome), dye intermediates, fats, oils and waxes (raw materials), flint ball, graphite, gums, resins and balsams, iron ore, pig iron, koalin, lacquer (natural), lead, manganese ore, mica, petroleum products, rosin, rubber (crude, scrap and latex), silicon steel (sheets), soda ash, talc, tanning materials, tin-plate, tungsten concentrate, ramie, and rayon pulp.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

MARTIN PHILLIPS & CO., LTD., Leicester, manufacturing chemists. (M., 13/3/48.) February 11, £1000 (not ex.) mortgage to Lloyds Bank, Ltd.; charged on 16 and 18 Cobden Street, Leicester. *£1000. May 23, 1946.

SCRUBB & CO., LTD., London, S.W., manufacturers of ammonia, etc. (M., 13/3/48.) February 10, Land Registry charge, to Midland Bank, Ltd., securing all moneys due or to become due to the Bank; charged on freehold property, at Merton. *Nil. April 9, 1947.

W. EDWARDS & Co., (LONDON) LTD. scientific apparatus dealers. (M., 13/3/48.) February 13 agreement dated February 9, 1948, securing to Industrial and Commercial Finance Corporation, Ltd., an advance to the company of £36,000 by instalments of £12,000 on the execution of this agreement, £16,000 on or after February 20, 1948, and £8,000 subsequent to February 20, 1948, as the company shall require and that in consideration of this advance the company shall issue to the said corporation second debentures securing the amounts advanced; charged on 38, 40 and 42 Southwell Road, Camberwell, and certain lands at Kangley Bridge Road, Beckenham and Salfords (Surrey), and fixed plant, machinery, etc., and a general charge; also February 13, second debenture securing £12,000 supplemental to above agreement dated February 9, 1948, to Industrial and Commercial Finance Corporation, Ltd.; charged on properties, etc., as in above agreement. *£37,048. August 11, 1947.

Satisfactions

CHINNOR CEMENT & LIME CO., LTD., London, E.C. (M.S., 13/3/48.) Satisfaction February 16, of debenture stock registered October 30 1936, to the extent of £1,587.

MIRALITE, LTD., London, E.C., metal manufacturers. (M.S., 13/3/48.) Satisfaction February 14, £1500, registered November 10, 1937.

WESTMINSTER LABORATORIES, LTD., London, N.W. (M.S., 13/3/48.) Satisfaction February 16, of charge registered April 4, 1946.

Company News

Albright & Wilson, Ltd., chemical manufacturers, is to be converted into a public company with an issued share capital of £1,076,582, of which £1,011,522 will be ordinary stock units of 5s. each.

The nominal capital of **Airmec Laboratories, Ltd.,** (formerly P.R.T. Laboratories, Ltd.), Cressex, Coronation Road, High Wycombe, has been increased beyond the registered capital of £10,000, by £240,000, in 960,000 ordinary 5s. shares.

The nominal capital of **B.X. Plastics, Ltd.,** Hale End, London, E.4, has been increased beyond the registered capital of £700,000 by £100,000, in £1 ordinary shares. The 100,000 6 per cent cumulative preference shares have been converted into ordinary shares. On March 19, 1947, the British Xylonite Co., Ltd., held 299,994 ordinary and 100,000 preference shares and the Distillers Co., Ltd., held 299,997 ordinary shares. A further 100,000 ordinary shares were allotted to the Distillers Co., Ltd., on January 27, 1948.

Chemical and Allied Stocks and Shares

WITH attention centred on the implications of the Economic Survey for 1948 and the impending **F.B.I. proposals on** price and profit reduction, stock market business again dwindled and movements generally were small and indefinite. There was, however, a better undertone in industrial shares which were inclined to respond to City suggestions that the Government may propose freezing dividends at 1946-47 levels. This it is felt would be preferable to another increase in Profits Tax which would mean that many companies would have to reduce dividend payments.

Chemical shares were moderately better in many instances, with Imperial Chemical 46s. 3d., Monsanto 57s. 6d., B. Laporte 5s. units 22s., W. J. Bush 85s., and Amber Chemical 2s. shares changed hands up to 10s. 4½d. English China Clays have been marked up to 21s. following the working party report and wider recognition that the industry earned considerable dollar exchange. Borax Consolidated at 56s. 10½d. were again better on further consideration of the full results. In common with most companies with interests in the U.S.A., earnings from the latter would be increased in their sterling equivalent if and when the £ were devalued. Both Lever & Unilever (51s. 1½d.), and Lever N.V. (48s. 9d.) have been more active, United Molasses strengthened to 46s. 9d., and the units of the Distillers Co. to 26s. 9d. Blythe Colour Works

4s. shares were dealt in up to 58s. it being pointed out that there is a good yield on the basis of the unchanged 80 per cent dividend and that in view of the further increase in profits, the rate of earnings is well in excess of the dividend payment.

In other directions, British Glues 4s. ordinary were 19s. 3d. and the participating preference 43s. 9d. There was a better trend among paint shares with International Paint changing hands over £7¼ partly on revived market talk that the £1 shares may be split into 5s. units. British Aluminium on higher dividend possibilities have remained firm at 46s. 6d. Amalgamated Metal were 18s. 1½d., Imperial Smelting 21s. 3d., and Metal Industries "B" 42s. 9d.

Iron and steels attracted buyers and rallied moderately. The market view is that unless the Profits Tax is increased, prospects of dividends being maintained are good and on this basis yields are generous. Moreover, it continues to be assumed that in the event of nationalisation a fair basis of compensation would have to be above current market prices. Stewarts & Lloyds strengthened to 51s. 9d., Guest Keen to 45s. 6d., while United Steel were 28s., Dorman Long 29s. 9d., Colvilles 29s. 9d., and elsewhere, T. W. Ward changed hands over 60s. 9d. Babcock & Wilcox rallied to 67s. 6d., and Vickers, awaiting the dividend, were better at 26s. 7½d., while British Oxygen were 91s. 3d. Elsewhere, Turner & Newall were 76s. 3d. British Plaster Board changed hands around 23s., and textiles became firmer generally, although Courtaulds eased to 41s., and British Celanese to 22s. 9d.

Boots Drug have rallied to 52s. 6d., Sangers were 31s. 9d., Timothy Whites 37s. 6d., and Beecham deferred 19s. 6d. In other directions, Murex were 78s. 9d. Oils moved lower in most cases, although changes on balance were mostly small. Anglo-Iranian came back to £7⅞, Shell were 76s. 3d., and Burmah Oil 68s. 1½d. As shares of electric supply companies are now ex dividend and free of stamp, the market is assuming there may be a good deal of selling by holders not wishing to exchange into British Electricity stock. The latter is expected to carry interest of 3 per cent per annum and to be shorter-dated than Transport stock.

British Chemical Prices

Market Reports

STEADY conditions have been maintained in the chemicals market during the week and prices generally are well held. Contract deliveries of industrial chemicals have covered good volume and a fair amount of new inquiries is reported both for home accounts and for shipment. A reduction in white lead prices has been announced. Dry white lead is now £2 10s. per ton less at £116 10s. per ton, and ground white lead £2 lower at £141 per ton. The lead oxides are reduced to the prices ruling on December 31 last. Changes elsewhere have been few and unimportant. Most of the soda products are in active request and there is an unsatisfied demand for the potash chemicals. Arsenic, barium chloride and formaldehyde are also active. In the coal-tar products market, the supply position dictates the volume of business and almost any parcel finds a ready market. Pitch and creosote oil have been in good export demand.

MANCHESTER.—A steady flow of new inquiries and a sizable amount of additional business has been reported on the Manchester chemical market during the past week. Business has included a fairly wide range of both light and heavy products, mainly for home use, though shippers have been prominent with offers of orders for exports. Existing orders for textile chemicals have been drawn against steadily by Lancashire and West Riding consumers, and other leading industrial users have also been specifying for steady deliveries. In the fertiliser section the pressure on supplies is steadily increasing. The by-products market has been affected so far as supplies are concerned by the brief strikes in the South Yorkshire and Durham coke-oven industries. Pretty well all classes of by-products are meeting with a good demand.

GLASGOW.—In the Scottish chemical market business has been a little more active during the past week. Although there has been no outstanding demand for any particular material all grades of chemicals have been fairly well absorbed. There has been little change in the supply position of those chemicals which have been in short supply for some time. The laundry industry has been less active in buying chemicals than usual, but this is probably merely a seasonal effect. There has been no noteworthy change in the export market, although there are indications that the opening up of the Swedish and Argentine markets will produce some good orders in the next few months. Demands from overseas have been mainly for coal-tar products and solvents which are, unfortunately, not available for export. In general there is no slackening off in the demand for chemicals required as basic materials in manufacturing in essential industries. The demand, however, by industries which may be classed as luxury trades would seem to be on the decrease.

Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted may be obtained from the Patent Office, Southampton Buildings, London, W.C.2., at 1s. each.

Complete Specifications Open to Public Inspection

Method of treating aluminium magnesium alloys.—Acme Aluminium Alloys, Inc. July 30, 1946. 20896/47.

Aluminium magnesium alloys.—Acme Aluminium Alloys, Inc. July 30, 1946. 20897/47.

Manufacture of high purity carbon.—Aktiebolaget Svenska Aluminiumkompaniet. July 28, 1943. 35017/47.

Preparation of peridines.—American Cyanamid Co. July 27, 1946. 16502/47.

Preparation of 2-amino-4-hydroxy-6-methyl pyrimido (4, 5-b) pyrazines.—American Cyanamid Co. July 27, 1946. 17675/47.

Hard metal compositions.—American Electro Metal Corporation. July 30, 1946. 18837/47.

Laminate surfacing compositions.—British Industrial Plastics, Ltd. July 19, 1946. 30862/47.

Process and apparatus for combined centrifuging for chemical energies.—J. Brun. July 20, 1946. 25392/47.

Manufacture of intermediate products.—Ciba, Ltd. July 26, 1946. 19141-42/47.

Manufacture of acyl derivatives of acetoacetic acid amides.—Ciba, Ltd. July 30, 1946. 20384-85/47.

Manufacture of amides of β-keto-carboxylic acids.—Ciba, Ltd. July 30, 1946. 20391-92/47.

Manufacture of pyrazolones substituted in the 3-position.—Ciba, Ltd. July 30, 1946. 20429-30/47.

Production of organic chlorine compounds.—E. I. du Pont de Nemours & Co. July 11, 1946. 18484/47.

Production of organic fluorine compounds. E. I. du Pont de Nemours & Co. July 12, 1946. 18485/47.

Production of fluoro hydrocarbons.—E. I. du Pont de Nemours & Co. July 24, 1946. 19896/47.

Chlorinated polythene compositions.—E. I. du Pont de Nemours & Co. July 25, 1946. 20058/47.

Treatment of chlorinated polythene.—E. I. du Pont de Nemours & Co. July 25, 1946. 20059/47.

Production of chlorinated polythene.—E. I. du Pont de Nemours & Co. July 25, 1946. 20068/47.

Chlorinated polythene compositions.—E. I. du Pont de Nemours & Co. July 25, 1946. 20069/47.

Manufacture of artificial fibres.—E. I. du Pont de Nemours & Co. July 26, 1946. 20070/47.

Production of organic nitrogen compounds.—E. I. du Pont de Nemours & Co. July 27, 1946. 20071/47.

Drier intended especially for drying casein.—Etablissements Billiez (Anciens Etablissements Hard & Billiez). January 22, 1940. 35270/47.

Azo dye compounds.—General Aniline & Film Corporation.—November 14, 1945. 14493/47.

Aldehyde compounds and processes of producing the same.—General Mills, Inc. February 15, 1946. 35043/47.

Process for the direct manufacture of concentrated nitric acid from the combustion of gas of ammonia.—P. Guareschi, L. Pettenati, and G. Maragliano. January 31, 1946. 35138/47.

Nitrogen containing derivatives of 3-pentadecyl phenol.—Harvel Corporation. July 31, 1946. 20558-59/47.

Process for regeneration of asphaltic oils.—Houilleres Nationales du Nord et du Pas-de-Calais. February 5, 1946. 35370/47.

Process of producing diphenylacetonitriles and the product resulting therefrom.—July 15, 1946. 8275/47.

Process for the manufacture of insecticides.—W. H. Manger, jun. June 7, 1946. 13941/47

Methods of producing sols and aerogels and the compounds resulting from said method.—Monsanto Chemical Co. May 8, 1939. 398/48.

Preparation of sols and the sols resulting from said process.—Monsanto Chemical Co. May 3, 1943. 399/48.

Methods of making stable sols and the sols resulting from the said methods.—Monsanto Chemical Co. November 9, 1940. 400/48.

Process for preparing unsaturated acid halides.—N. V. de Bataafsche Petroleum Maatschappij. June 15, 1946. 9728/47.

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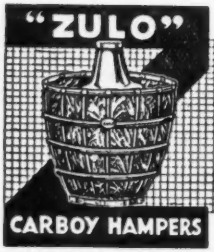

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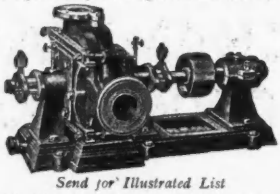

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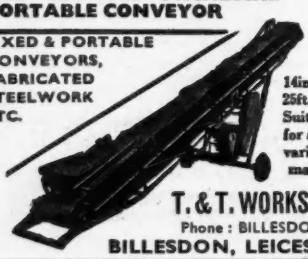

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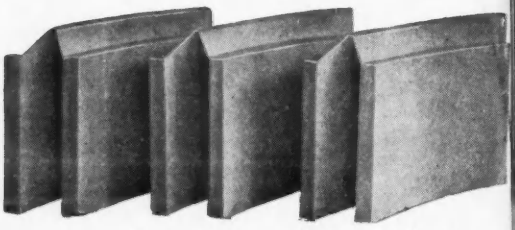

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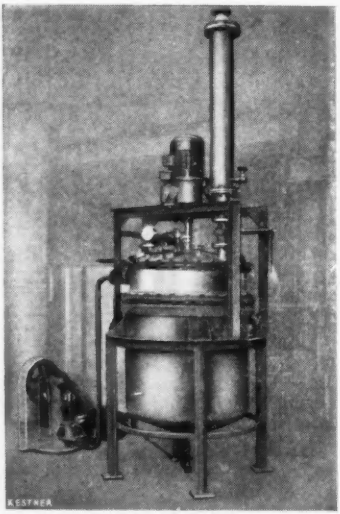

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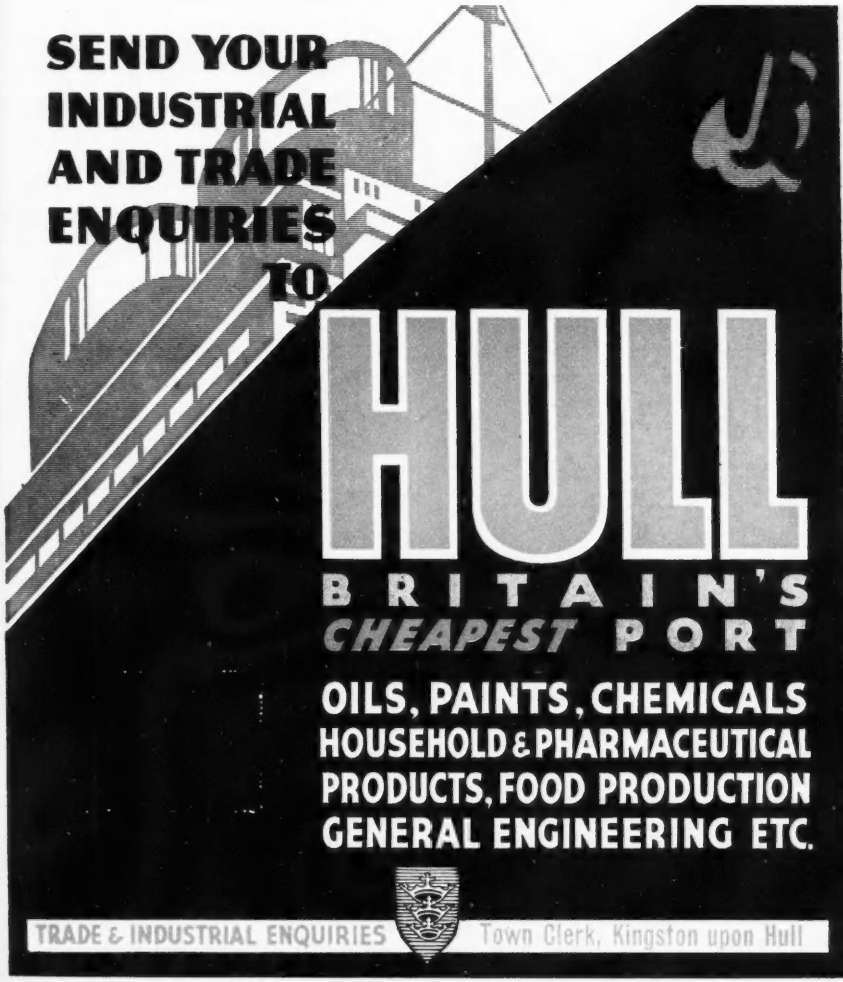

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Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted may be obtained from the Patent Office, Southampton Buildings, London, W.C.2., at 1s. each.

Complete Specifications Open to Public Inspection

Method of treating aluminium magnesium alloys.—Acme Aluminium Alloys, Inc. July 30, 1946. 20896/47.

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ANALYTICAL CHEMIST required by North East Coast chemical engineering firm. Applications should be experienced in the examination of edible oils and fats and modern methods of production. Applicants should not be more than 35 years of age and preferably under 30 years of age. Adequate technical qualifications are desirable. Firm normally works a 5-day week, and has superannuation and life insurance schemes. Salary offered, £450-£600 per annum depending on qualifications. Apply, giving full information, to Box No. 2614, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

A PROGRESSIVE Company in the Midlands, manufacturing plastic materials, requires the services of qualified Engineers and Mechanical and Electrical Draughtsmen. Applicants for the engineering appointments should be at least of higher national certificate standard. All applicants should have some experience of mechanical or chemical plant layout and design. The vacancies offer ample opportunities of advancement for the right type of applicant. Applications, stating previous experience, positions held and academic qualifications, should be sent to Box No. 2611, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

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The appointment will be terminable by one month's notice on either side and subject to the provisions of the Local Government Act, 1937. The successful applicant will be required to pass a medical examination and to devote his whole time to the duties of the office.

Applications, giving the names of three persons to whom reference may be made, should reach the **City Engineer, Town Hall, Oxford,** not later than Monday, 29th March, 1948.

H. PLOWMAN,
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Town Hall,
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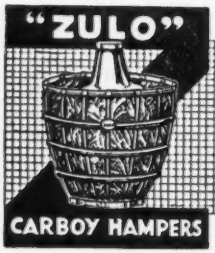

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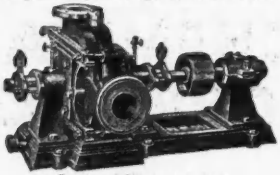

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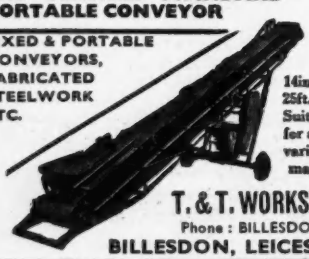

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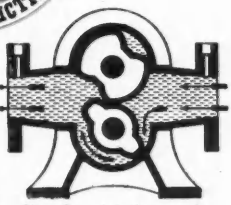

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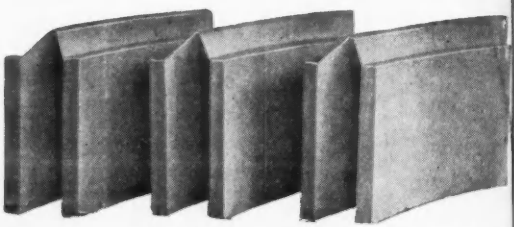

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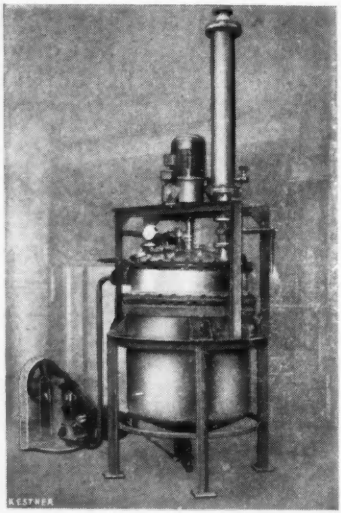

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